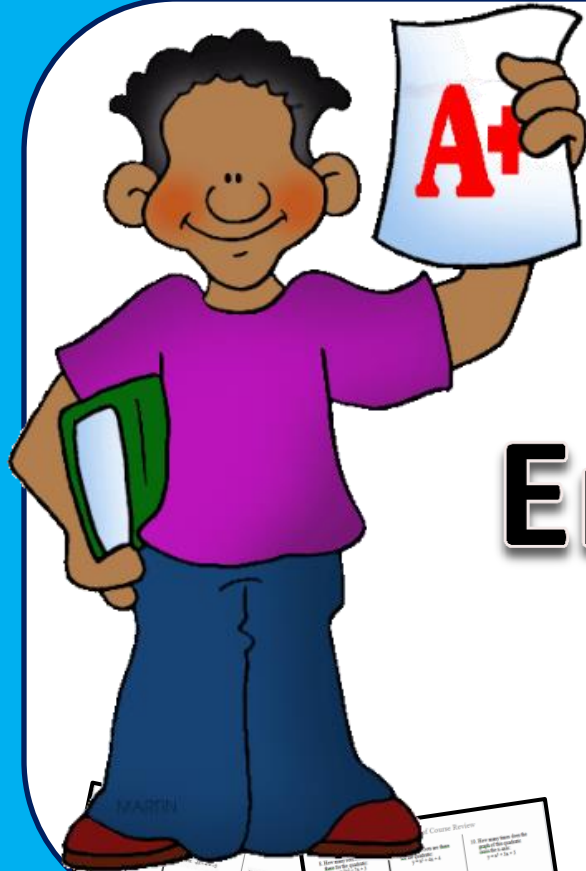
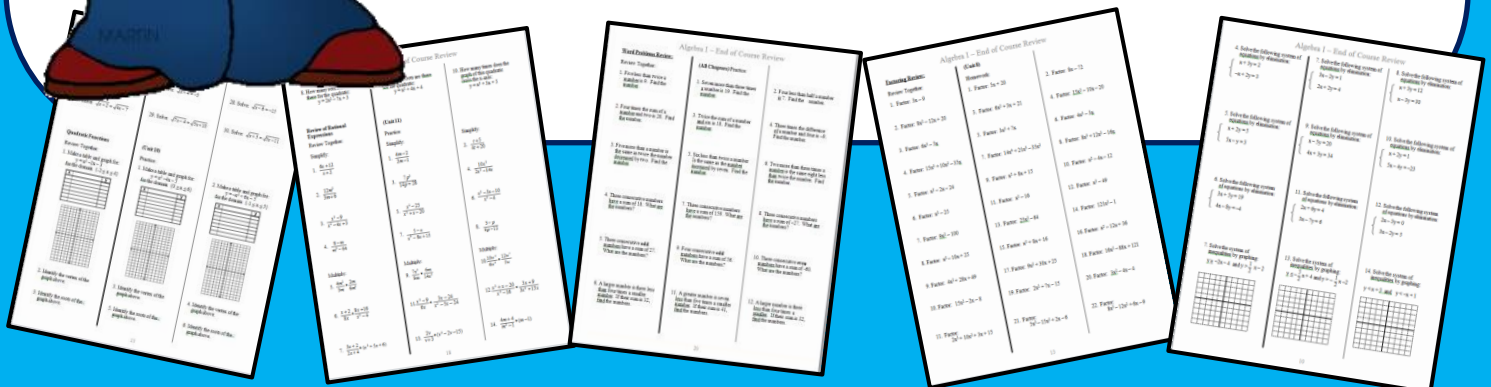


# Algebra 1



## Giant 24 page End of Course Review



# Algebra I – End of Course Review

## Properties and PEMDAS

1. Name the property shown:

$$a + b + c = b + a + c$$

2. Name the property shown:

$$a(b + c) = ab + ac$$

3. Name the property shown:

$$(a + b) + c = a + (b + c)$$

4. Name the property shown:

$$a + 0 = a$$

5. Simplify using PEMDAS

$$30 - 2 \cdot 3^2 + 5$$

6. Simplify using PEMDAS

$$20 - 3(4 + 1) \div 5$$

## (Unit 1)

1. Name the property shown:

$$a(b) = b(a)$$

3. Name the property shown:

$$a \cdot 1 = a$$

5. Name the property shown:

$$a \cdot b = b \cdot a$$

7. Name the property shown:

$$abc = cab$$

9. Simplify using PEMDAS

$$2(5 - 2 + 1)^2 - 6$$

11. Simplify using PEMDAS

$$(-3)^2 - 7 + 10 \cdot 2$$

2. Name the property shown:

$$m + 0 = m$$

4. Name the property shown:

$$(a \cdot b) \cdot c = a \cdot (b \cdot c)$$

6. Name the property shown:

$$a + (-a) = 0$$

8. Name the property shown:

$$a \cdot 0 = 0$$

10. Simplify using PEMDAS

$$2(8 + 1) - 6 \div 2$$

12. Simplify using PEMDAS

$$9 + 24 \div (2)^3 \cdot 3$$

## Solving Equations

Review Together:

1.  $5 - x = -6$

2.  $1p + 26 - 10p = -1$

## (Unit 2)

Homework:

1.  $25 = -35 - x$

3.  $6m - 2 - 9m = 1$

2.  $-7 - x = -3$

4.  $-2x + 5 - 2x = 13$

## Algebra I – End of Course Review

3.  $5x - 2(x + 4) = 28$

5.  $4x - 3(x - 2) = 21$

6.  $2x - 5(x - 9) = 27$

4.  $-\frac{1}{3}x + 6 = -8$

7.  $7 + \frac{2}{3}x = -1$

8.  $22 = 18 - \frac{1}{4}x$

5.  $7x + 19 = -2x + 55$

9.  $6x + 22 = -3x + 31$

10.  $12p - 7 = -3p + 8$

6.  $x + \frac{4}{3} = -\frac{2}{3}x - 2$

11.  $\frac{1}{2}x + 1 = \frac{3}{2}x - \frac{1}{2}$

12.  $4 - \frac{2}{3}x = -\frac{5}{3}x - 3$

7.  $\frac{x}{3} = \frac{2}{11}$

13.  $\frac{5}{x} = \frac{3}{7}$

14.  $\frac{6}{7} = \frac{x}{5}$

8.  $\frac{x+3}{2} = \frac{x-2}{5}$

15.  $\frac{x+4}{x-1} = \frac{6}{9}$

16.  $\frac{x+1}{7} = \frac{x-3}{2}$

# Algebra I – End of Course Review

## Inequalities

Review Together:

1.  $-(x+8) > 2x+4$

← + + + + + + + + + + →

2.  $-7 < 6x - 25$

← + + + + + + + + + + →

3.  $12 \leq -2x - 6$

← + + + + + + + + + + →

4.  $-10 < 2x - 6 < 8$

← + + + + + + + + + + →

## Absolute Value

Solve and graph and write the final answer:

1.  $4|x| + 8 = 20$

← + + + + + + + + + + →

2.  $|x-2| + 8 = 20$

← + + + + + + + + + + →

## (Unit 3)

Homework:

1.  $x+3 \leq 2(x-4)$

← + + + + + + + + + + →

3.  $-6 + 5x > 19$

← + + + + + + + + + + →

5.  $-x + 9 \geq 14$

← + + + + + + + + + + →

7.  $8 < 3x + 2 < 32$

← + + + + + + + + + + →

## (Unit 3 Continued)

1.  $-2|x| + 7 = -3$

← + + + + + + + + + + →

3.  $|x+7| - 2 = 10$

← + + + + + + + + + + →

2.  $-x - 4 < 3(x-4)$

← + + + + + + + + + + →

4.  $-17 > 5x - 2$

← + + + + + + + + + + →

6.  $7 - 3x < 16$

← + + + + + + + + + + →

8.  $13 > -2x + 1 > -5$

← + + + + + + + + + + →

2.  $3|x| - 8 = 7$

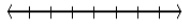
← + + + + + + + + + + →

4.  $|x-1| - 3 = 5$

← + + + + + + + + + + →

# Algebra I – End of Course Review

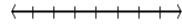
3.  $2|x| + 2 < 20$



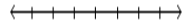
4.  $2|x| - 6 > 4$



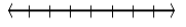
5.  $2|x| + 1 < 11$



7.  $|x| - 2 > 8$



6.  $4|x| - 2 \leq 22$



8.  $|x| + 3 \geq 4$

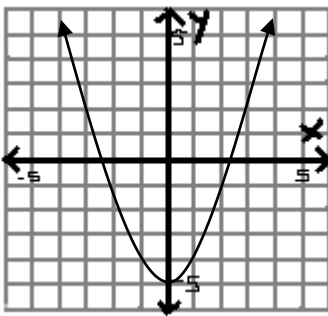


## Recognizing Functions

1. Give the function rule of the table:

x	f(x)
-2	-9
-1	-4
0	1
1	6
2	11

2. Is the graph a function?



3. Give the domain and range of the following set of points:  
(3, 7) (-2, 5) (-8, -1) (-2, 3)

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

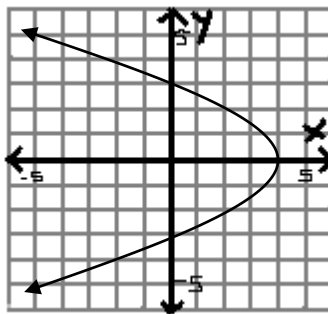
Is the relation a function? \_\_\_\_\_

## (Unit 4)

1. Give the function rule of the table:

x	y
-2	-7
-1	-4
0	-1
1	2
2	5

3. Is the graph a function?



5. Give the domain and range of the following set of points:  
(3, 7) (1, 7) (6, -2) (-8, 2)

Domain: \_\_\_\_\_

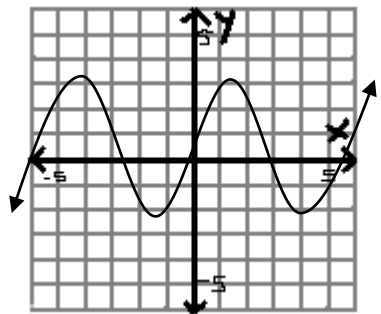
Range: \_\_\_\_\_

Is the relation a function? \_\_\_\_\_

2. Give the function rule of the table:

x	f(x)
-2	1
-1	2
0	3
1	4
2	5

4. Is the graph a function?



6. Give the domain and range of the following set of points:  
(6, -1) (-4, 3) (-7, -2) (6, -5)

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Is the relation a function? \_\_\_\_\_

# Algebra I – End of Course Review

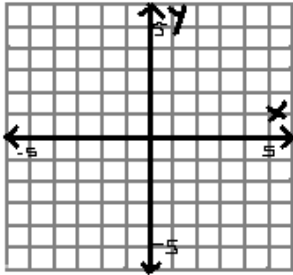
## Basic Linear Graphing

Review Together:

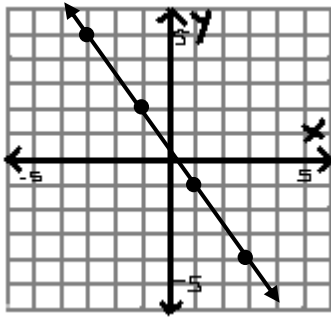
1. Complete the table and graph from the equation:

$$y = 2x - 3$$

x	y



2. Give the slope of the line:

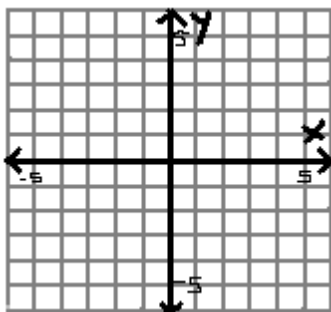


3. Solve for y and name the slope and y-intercept:

$$3x - 2y = 6 \quad m =$$

$$b =$$

4. Graph the following line from its slope and y-intercept:  $y = 4x - 2$



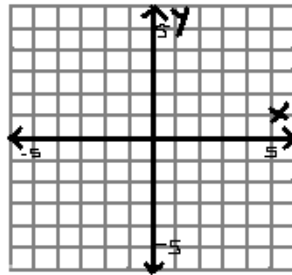
## (Unit 5)

Homework:

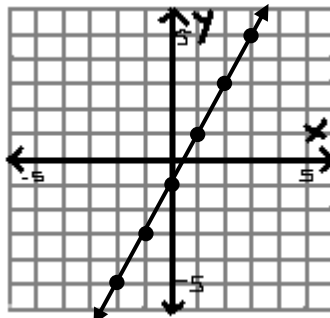
1. Complete the table and graph from the equation:

$$y = -x + 4$$

x	y



3. Give the slope of the line:

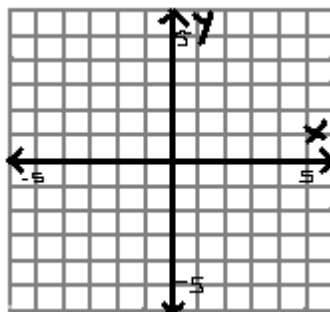


5. Solve for y and name the slope and y-intercept:

$$2x + 4y = -8 \quad m =$$

$$b =$$

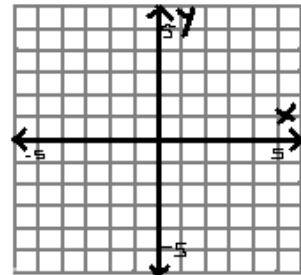
7. Graph the following line from its slope and y-intercept:  $y = -3x + 5$



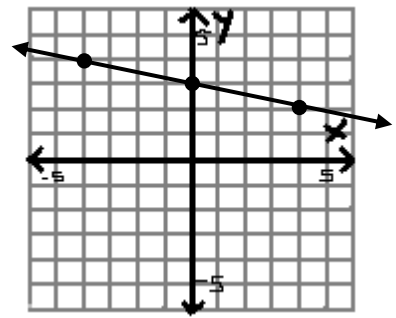
2. Complete the table and graph from the equation:

$$y = -5x + 4$$

x	y



4. Give the slope of the line:

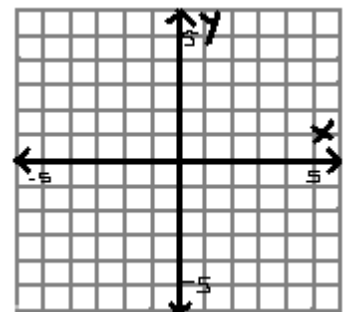


6. Solve for y and name the slope and y-intercept:

$$-5x - 3y = -15 \quad m =$$

$$b =$$

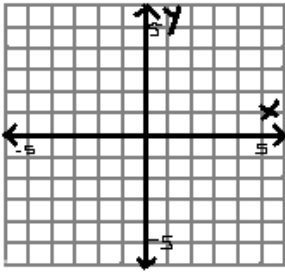
8. Graph the following line from its slope and y-intercept:  $y = 2x + 1$



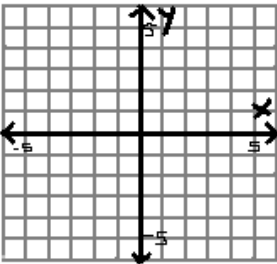
# Algebra I – End of Course Review

5. Graph the following line from its slope and

y-intercept:  $y = \frac{2}{3}x - 2$



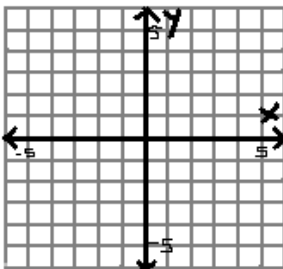
6. Graph  $y = 3$  and  $x = -2$  and name their slopes:



## Algebra with Linear Equations:

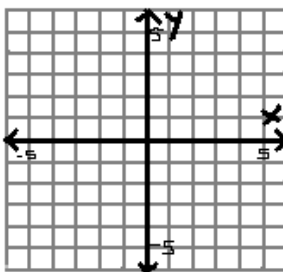
Review Together:

1. Is the point  $(-2, -1)$  a solution to the equation:  $y = 3x - 5$
2. Name the x and y intercepts of the equation:  
 $-3x + 2y = -12$
3. Graph from the x and y intercepts:  
 $-5x + 2y - 10 = 0$

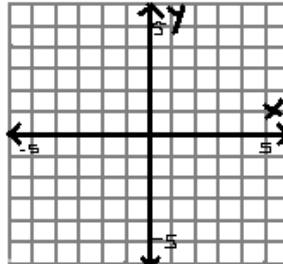


9. Graph the following line from its slope and

y-intercept:  $y = \frac{1}{3}x + 1$



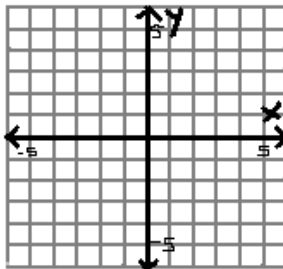
11. Graph  $y = -4$  and  $x = 5$  and name their slopes:



## (Unit 5 Continued)

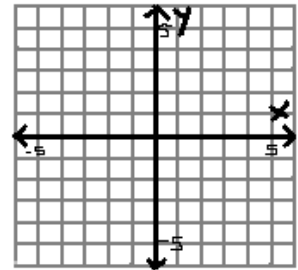
Homework:

1. Is the point  $(-1, 3)$  a solution to the equation:  $y = -4x - 1$
3. Name the x and y intercepts of the equation:  
 $4x + 2y - 8 = 0$
5. Graph from the x and y intercepts:  
 $2x - 6y + 12$

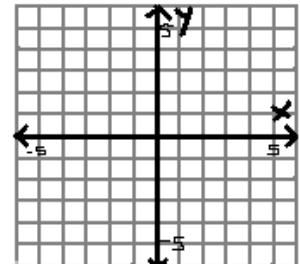


10. Graph the following line from its slope and

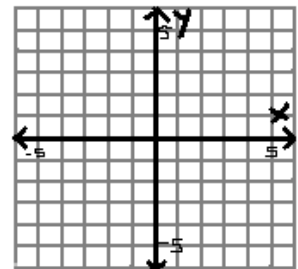
y-intercept:  $y = -\frac{1}{2}x + 3$



12. Graph  $y = 1$  and  $x = -3$  and name their slopes:



2. Is the point  $(-2, 0)$  a solution to the equation:  $y = -2x + 4$
4. Name the x and y intercepts of the equation:  
 $5x - 3y = 15$
6. Graph from the x and y intercepts:  
 $-5x - 4y = -20$



# Algebra I – End of Course Review

## Review Together:

4. Give the *slope* of the line that goes through the points:  
 $(-4, -1)$  and  $(5, -7)$

5. Give the *slope* of the line that goes through the points:  
 $(-3, -1)$  and  $(2, -1)$

6. Give the *equation* of the line with a slope of 3 that goes through the point  $(2, -1)$

7. Give the *equation* of the line that goes through the points:  
 $(1, 3)$  and  $(2, 5)$

8. Give the *equation* of the line that is **parallel** to the line  
 $y = -3x + 1$   
and goes through  $(-5, -6)$ .

## Homework:

7. Give the *slope* of the line that goes through the points:  
 $(-2, 5)$  and  $(4, -7)$

9. Give the *slope* of the line that goes through the points:  
 $(5, -2)$  and  $(5, 1)$

11. Give the *equation* of the line with a slope of  $\frac{1}{2}$  that goes through the point  $(4, 3)$

13. Give the *equation* of the line that goes through the points:  
 $(-2, 3)$  and  $(2, -5)$

15. Give the *equation* of the line that is **parallel** to the line  
 $y = -4x - 6$   
and goes through  $(1, 8)$ .

8. Give the *slope* of the line that goes through the points:  
 $(0, 8)$  and  $(-1, 2)$

10. Give the *slope* of the line that goes through the points:  
 $(5, 2)$  and  $(4, 2)$

12. Give the *equation* of the line with a slope of  $-2$  that goes through the point  $(-5, -7)$

14. Give the *equation* of the line that goes through the points:  
 $(6, 2)$  and  $(8, -4)$

16. Give the *equation* of the line that is **parallel** to the line  
 $y = -5x - 2$   
and goes through the point  
 $(3, -9)$ .



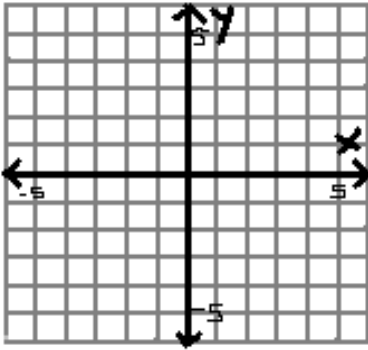
# Algebra I – End of Course Review

Review Together:

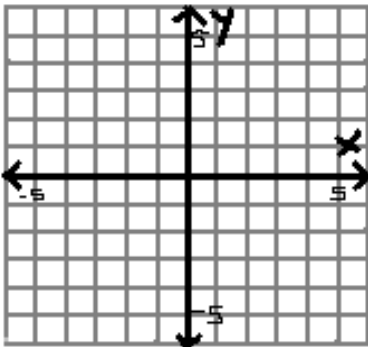
9. Give the *equation* of the line that is **perpendicular** to the line  $y = 3x - 2$  and goes through  $(6, 5)$ .

## Graphing Inequalities:

1. Graph the inequality:  
 $y > 2x - 3$



2. Graph the inequality:  
 $-2y \geq -4x + 8$

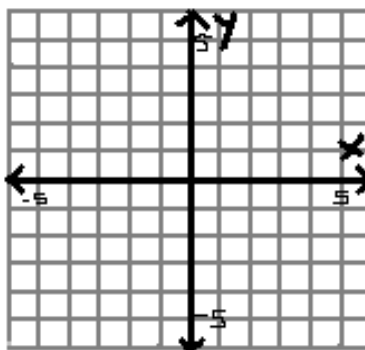


Homework:

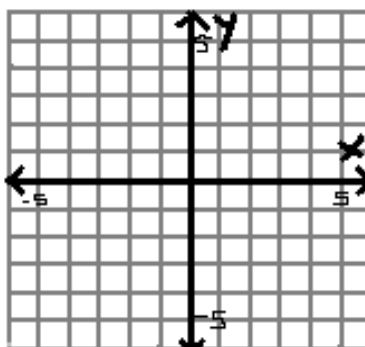
17. Give the *equation* of the line that is **perpendicular** to the line  $y = -\frac{1}{4}x - 2$  and goes through  $(-1, 2)$ .

## (Unit 5 Continued)

1. Graph the inequality:  
 $y < -3x + 5$

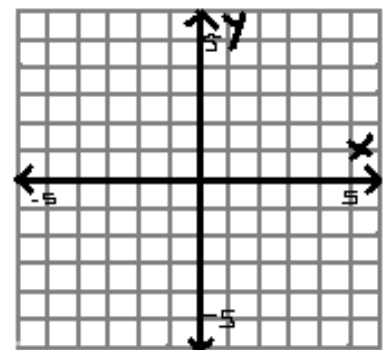


3. Graph the inequality:  
 $3y \leq 2x + 3$

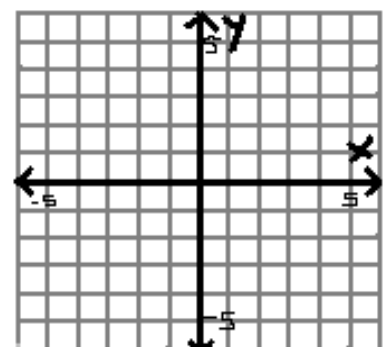


18. Give the *equation* of the line that is **perpendicular** to the line  $y = -2x + 4$  and goes through the point  $(4, -2)$ .

2. Graph the inequality:  
 $y > \frac{1}{2}x - 1$



4. Graph the inequality:  
 $-y \leq -3x + 2$



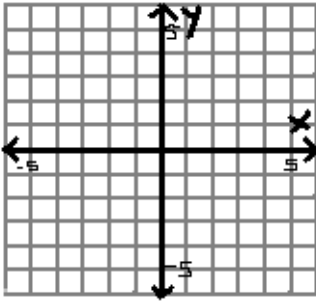
# Algebra I – End of Course Review

## Solving Systems of Equations:

Review Together:

1. Solve the following system of equations by graphing:

$$\begin{cases} y = -x - 4 \\ y = 3x + 4 \end{cases}$$



2. Solve the following system of equations by substitution:

$$\begin{cases} y = -3x + 5 \\ 2x - y = 10 \end{cases}$$

3. Solve the following system of equations by substitution:

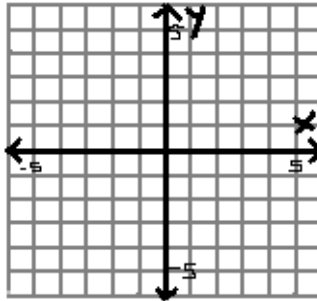
$$\begin{cases} 3x + y = 3 \\ 7x + 2y = 1 \end{cases}$$

## (Unit 6)

Homework:

1. Solve the following system of equations by graphing:

$$\begin{cases} x + y = 2 \\ 2x - y = 4 \end{cases}$$



3. Solve the following system of equations by substitution:

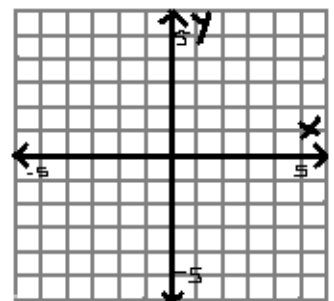
$$\begin{cases} x = -2y + 4 \\ -x + y = -7 \end{cases}$$

5. Solve the following system of equations by substitution:

$$\begin{cases} 2x + y = 4 \\ -x + y = 1 \end{cases}$$

2. Solve the following system of equations by graphing:

$$\begin{cases} 2x + y = 4 \\ -x + y = 1 \end{cases}$$



4. Solve the following system of equations by substitution:

$$\begin{cases} y = -x + 1 \\ 2x + y = -2 \end{cases}$$

6. Solve the following system of equations by substitution:

$$\begin{cases} x + y = 4 \\ 4x + y = 1 \end{cases}$$

# Algebra I – End of Course Review

4. Solve the following system of equations by elimination:

$$\begin{cases} x + 3y = 2 \\ -x + 2y = 3 \end{cases}$$

5. Solve the following system of equations by elimination:

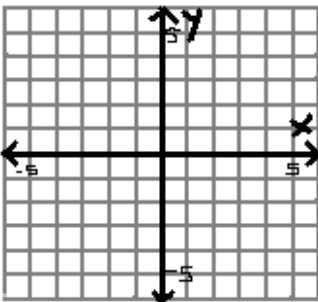
$$\begin{cases} x + 2y = 5 \\ 5x - y = 3 \end{cases}$$

6. Solve the following system of equations by elimination:

$$\begin{cases} 3x + 5y = 19 \\ 4x - 8y = -4 \end{cases}$$

7. Solve the system of inequalities by graphing:

$$y \geq -2x - 4 \text{ and } y > \frac{1}{2}x - 2$$



7. Solve the following system of equations by elimination:

$$\begin{cases} 3x - 2y = 1 \\ 2x + 2y = 4 \end{cases}$$

9. Solve the following system of equations by elimination:

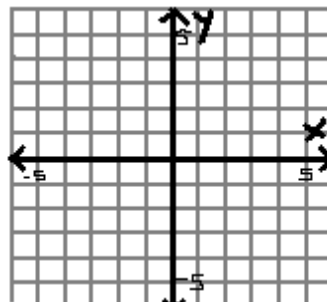
$$\begin{cases} x - 5y = 20 \\ 4x + 3y = 34 \end{cases}$$

11. Solve the following system of equations by elimination:

$$\begin{cases} 2x + 6y = 4 \\ 3x - 7y = 6 \end{cases}$$

13. Solve the system of inequalities by graphing:

$$y \leq -\frac{5}{2}x + 4 \text{ and } y > -\frac{1}{2}x - 2$$



8. Solve the following system of equations by elimination:

$$\begin{cases} x + 3y = 12 \\ x - 3y = 30 \end{cases}$$

10. Solve the following system of equations by elimination:

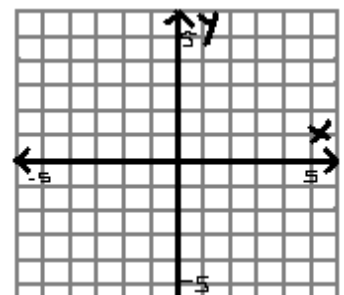
$$\begin{cases} x + 2y = 1 \\ 5x - 4y = -23 \end{cases}$$

12. Solve the following system of equations by elimination:

$$\begin{cases} 2x - 3y = 0 \\ 3x - 2y = 5 \end{cases}$$

14. Solve the system of inequalities by graphing:

$$y < x + 3 \text{ and } y < -x + 1$$



# Algebra I – End of Course Review

## Exponent Rules Review:

Review Together:

1. Simplify:  $4^2 \cdot 4^3$
2. Simplify:  $n^3 \cdot n^3 \cdot n^4$
3. Simplify:  $x^5 \cdot x^{-3} \cdot x^{-1}$
4. Simplify:  $(-4x^3y^2)^6$
5. Simplify:  $x^0$
6. Simplify:  $8^2x^0y^3 \cdot 8x^4y^6$
7. Simplify:  $(3x^2y^3)^2 \cdot (2x^4y)^3$
8. Simplify:  $x^2(3x^3)^4$
9. Simplify with positive exponents:  $3x^{-2}y^3z^{-4}x^3$
10. Simplify with positive exponents:  $\frac{3x^4y}{6x^2y^3}$
11. Simplify with positive exponents:  $\frac{x^3}{x^{-5}}$

## (Unit 7)

Homework:

1. Simplify:  $3^2 \cdot 3^3 \cdot 3^5 \cdot 3^5$
3. Simplify:  $g^5 \cdot g \cdot g^6$
5. Simplify:  $m^2 \cdot m^{-2} \cdot m^6$
7. Simplify:  $(-2x^4y^5)^5$
9. Simplify:  $p^0$
11. Simplify:  $3^3m^2p^{-1} \cdot 2m^3p^5$
13. Simplify:  $(2m^4p^5)^3 \cdot (5mp^2)^2$
15. Simplify:  $p^3m(2p^5)^4$
17. Simplify with positive exponents:  $5g^5m^2g^4m^{-6}$
19. Simplify with positive exponents:  $\frac{2a^5b}{8a^2b^3}$
21. Simplify with positive exponents:  $\frac{m^3}{m^{-4}}$
2. Simplify:  $2^6 \cdot 2^9$
4. Simplify:  $x^3 \cdot x^5 \cdot x^4$
6. Simplify:  $b^{-4} \cdot b^2 \cdot b^{-5}$
8. Simplify:  $(-3x^3y^5)^2$
10. Simplify:  $(10p^3)^0$
12. Simplify:  $5^2a^3b^5 \cdot 3a^4b^2$
14. Simplify:  $(2a^5b^4)^2 \cdot (3a^2b)^5$
16. Simplify:  $3a^5b^2(5a^2b^4)^3$
18. Simplify with positive exponents:  $-9a^6b^{-3}c^{-8}a^4b^2c^3$
20. Simplify with positive exponents:  $\frac{20m^4p^3y}{4m^8y^3}$
22. Simplify with positive exponents:  $\frac{m^2p^{-6}x^3}{m^{-7}p^4x^5}$

# Algebra I – End of Course Review

## Adding and Multiplying Polynomials.:

Review Together:

12.  $-3x^2 + 4x - 5 + 4x^2 - 7x - 2$

13.  $4xy^2 + 3x^3 - 2y - xy^2 + 5x^3$

14.  $(-5x^2 - 6x - 5) + (4x^2 + 3x + 8)$

15.  $(3x^2 + 4x - 2) - (5x^2 + 3x - 5)$

Multiply:

16.  $(x + 2)(x - 5)$

17.  $(2x - 4)(3x + 5)$

18.  $(x + 2)(3x^2 - 4x + 5)$

19.  $(x + 5)(x - 5)$

20.  $(x + 4)^2$

21.  $(x - 5)^2$

22.  $(2x + 3)^2$

## (Unit 8)

Homework:

23.  $8x^2 - 7x - 2 + 5x^2 + x - 4$

25.  $-3m^3p^2 - 4m^4 + 6m^3p^2 + 2m^4$

27.  $(9x^2 + 3x - 2) + (-x^2 - 2x + 6)$

29.  $(-x^2 - 5x - 1) - (-3x^2 + x - 1)$

31.  $(x + 6)(x - 3)$

33.  $(3x - 2)(4x - 3)$

35.  $(x - 3)(2x^2 + 6x - 4)$

37.  $(x + 7)(x - 7)$

39.  $(x + 2)^2$

41.  $(x - 3)^2$

43.  $(3x + 4)^2$

24.  $-6x^2 + 9x + 3 - x^2 - 4x + 5$

26.  $5x^3 - 9x^3p - 4x^2 - 3x^3p + 5x^3$

28.  $(-x^2 - 3x + 6) + (8x^2 + x - 9)$

30.  $(-2x^2 + 5x) - (-4x^2 - 2x + 8)$

32.  $(x - 4)(x + 3)$

34.  $(5x + 2)(3x - 1)$

36.  $(x + 5)(x^2 - 3x - 8)$

38.  $(x + 2)(x - 2)$

40.  $(x + 9)^2$

42.  $(x - 6)^2$

44.  $(5x + 1)^2$

# Algebra I – End of Course Review

## Factoring Review:

Review Together:

1. Factor by GCF:  $3x - 9$
2. Factor by GCF:  
 $8x^2 - 12x + 20$
3. Factor by GCF:  $6x^2 - 5x$
4. Factor by GCF:  
 $15x^3 + 10x^2 - 35x$
5. Factor:  $x^2 - 2x - 24$
6. Factor:  $x^2 - 25$
7. Factor:  $9x^2 - 100$
8. Factor:  $x^2 - 10x + 25$
9. Factor:  $4x^2 + 28x + 49$
10. Factor:  $15x^2 - 2x - 8$
11. Factor:  
 $2x^3 + 10x^2 + 3x + 15$

## (Unit 8)

Homework:

1. Factor by GCF:  $5x + 20$
3. Factor by GCF:  
 $6x^2 + 3x + 21$
5. Factor by GCF:  $3x^2 + 7x$
7. Factor by GCF:  
 $14x^4 + 21x^3 - 35x^2$
9. Factor:  $x^2 + 8x + 15$
11. Factor:  $x^2 - 16$
13. Factor:  $25x^2 - 64$
15. Factor:  $x^2 + 8x + 16$
17. Factor:  $9x^2 + 30x + 25$
19. Factor:  $2x^2 + 7x - 15$
21. Factor:  
 $5x^3 - 15x^2 + 2x - 6$
2. Factor by GCF:  $8x - 72$
4. Factor by GCF:  
 $15x^2 - 10x - 20$
6. Factor by GCF:  $4x^2 - 3x$
8. Factor by GCF:  
 $8x^3 + 12x^2 - 16x$
10. Factor:  $x^2 - 4x - 12$
12. Factor:  $x^2 - 49$
14. Factor:  $121x^2 - 1$
16. Factor:  $x^2 - 12x + 36$
18. Factor:  $16x^2 - 88x + 121$
20. Factor:  $3x^2 - 4x - 4$
22. Factor:  
 $8x^3 - 12x^2 + 6x - 9$

# Algebra I – End of Course Review

## Simplifying Radical Expressions:

Review Together:

1. Simplify:  $\sqrt{36}$

2. Simplify:  $\sqrt{40}$

**From here on – use only principal roots:**

3. Simplify:  $\sqrt{50x^3p^8}$

4. Multiply:  $\sqrt{6} \cdot -\sqrt{7}$

5. Multiply:  $\sqrt{6} \cdot \sqrt{15}$

6. Multiply:  $4\sqrt{3} \cdot 5\sqrt{15}$

7. Multiply:  $4\sqrt{6x^3} \cdot 2\sqrt{12x^4}$

8. Simplify:  
 $\frac{\sqrt{20}}{\sqrt{4}}$

9. Simplify:  
 $\sqrt{\frac{16x^3}{49x^2}}$

10. Rationalize:  
 $\frac{2}{\sqrt{6}}$

11. Simplify:  $2\sqrt{5} + 6\sqrt{5}$

12. Simplify:  $6\sqrt{3} - 5\sqrt{12}$

## (Unit 9)

Practice:

1. Simplify:  $\sqrt{81}$

3. Simplify:  $\sqrt{18}$

**From here on – use only principal roots:**

5. Simplify:  $\sqrt{27m^{10}x^9}$

7. Multiply:  $\sqrt{3} \cdot \sqrt{5}$

9. Multiply:  $-\sqrt{5} \cdot \sqrt{10}$

11. Multiply:  $-\sqrt{2} \cdot 3\sqrt{6}$

13. Multiply:  $2\sqrt{2x^5} \cdot 3\sqrt{14x^3}$

15. Simplify:  
 $\frac{\sqrt{15}}{\sqrt{5}}$

17. Simplify:  
 $\sqrt{\frac{18x^5}{9x}}$

19. Rationalize:  
 $\frac{7}{\sqrt{2}}$

21. Simplify:  $5\sqrt{2} - \sqrt{2}$

23. Simplify:  $-7\sqrt{5} + 3\sqrt{20}$

2. Simplify:  $\sqrt{121}$

4. Simplify:  $\sqrt{75}$

**From here on – use only principal roots:**

6. Simplify:  $\sqrt{200x^4p^7}$

8. Multiply:  $-\sqrt{2} \cdot \sqrt{11}$

10. Multiply:  $\sqrt{10} \cdot \sqrt{2}$

12. Multiply:  $2\sqrt{5} \cdot 5\sqrt{6}$

14. Multiply:  $-3\sqrt{5x^2} \cdot \sqrt{10x^5}$

16. Simplify:  
 $\frac{\sqrt{24}}{\sqrt{6}}$

18. Simplify:  
 $\sqrt{\frac{200x^6p^4}{100x^4p^3}}$

20. Rationalize:  
 $\frac{15}{\sqrt{3}}$

22. Simplify:  $6\sqrt{7} + 3\sqrt{7}$

24. Simplify:  $7\sqrt{10} - \sqrt{90}$

# Algebra I – End of Course Review

13. Solve:  $\sqrt{x} + 4 = -7$

14. Solve:  $\sqrt{x-2} = 5$

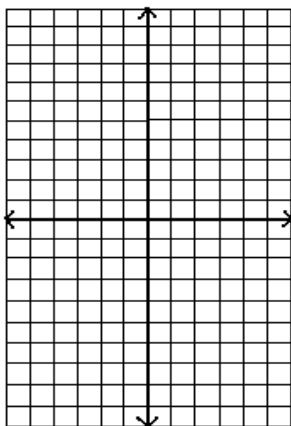
15. Solve:  $\sqrt{x+2} = \sqrt{4x-7}$

## Quadratic Functions

Review Together:

1. Make a table and graph for:  
 $y = x^2 - 2x - 3$   
 for the domain  $\{-2 \leq x \leq 4\}$

x		y



2. Identify the vertex of the graph above.
3. Identify the roots of the : graph above.

25. Solve:  $\sqrt{x} + 8 = -2$

27. Solve:  $\sqrt{x+4} = -3$

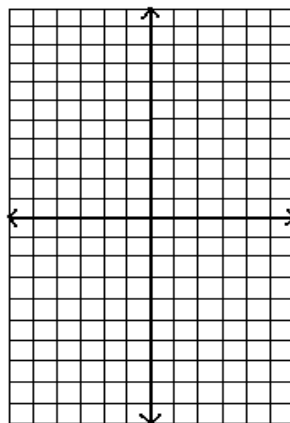
29. Solve:  $\sqrt{7x-4} = \sqrt{5x+10}$

## (Unit 10)

Practice:

1. Make a table and graph for:  
 $y = x^2 - 4x - 5$   
 for the domain  $\{-1 \leq x \leq 5\}$

x		y



3. Identify the vertex of the graph above.
5. Identify the roots of the : graph above.

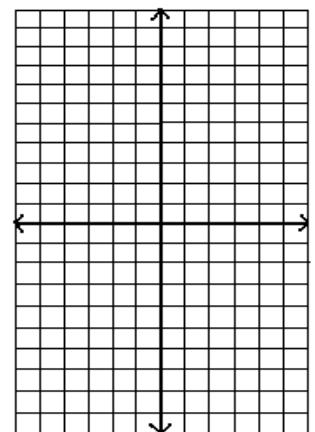
26. Solve:  $\sqrt{x} - 5 = 12$

28. Solve:  $\sqrt{x-6} = -15$

30. Solve:  $\sqrt{x+5} = \sqrt{5x-11}$

2. Make a table and graph for:  
 $y = -x^2 + 6x - 5$   
 for the domain  $\{0 \leq x \leq 6\}$

x		y

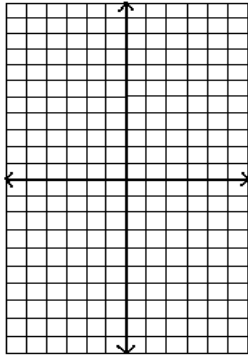


4. Identify the vertex of the graph above.
6. Identify the roots of the : graph above.

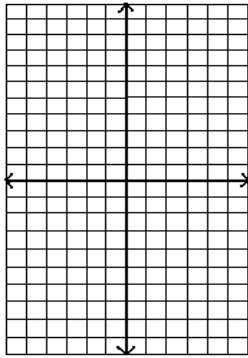


# Algebra I – End of Course Review

4. Use the parent graph pattern to graph:  $y = -x^2 + 4$

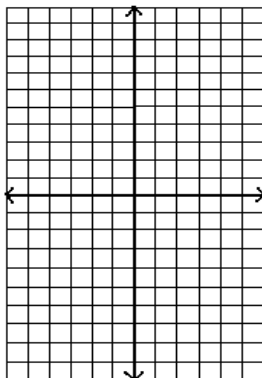


5. Double the parent graph pattern to graph:  $y = -2x^2 + 6$



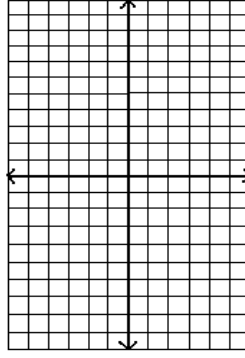
6. Find the vertex of:  
 $y = -x^2 - 4x - 6$

7. Now make a graph for the quadratic from # 6

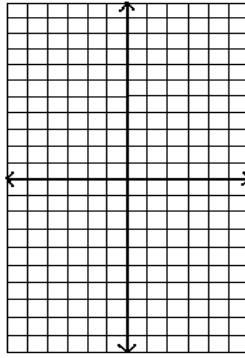


Is the vertex a maximum or minimum value? \_\_\_\_\_  
Give the domain: \_\_\_\_\_  
Give the range: \_\_\_\_\_

7. Use the parent graph pattern to graph:  $y = x^2 - 7$

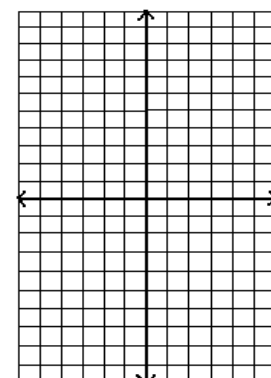


9. Triple the parent graph pattern to graph:  $y = 3x^2 - 8$



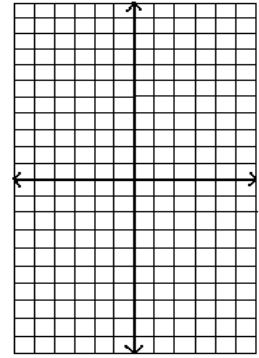
11. Find the vertex of:  
 $y = x^2 - 6x + 5$

13. Now make a graph for the quadratic from # 11

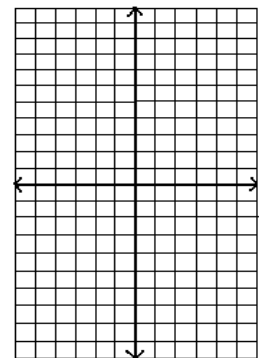


Is the vertex a maximum or minimum value? \_\_\_\_\_  
Give the domain: \_\_\_\_\_  
Give the range: \_\_\_\_\_

8. Use the parent graph pattern to graph:  $y = -x^2 - 2$

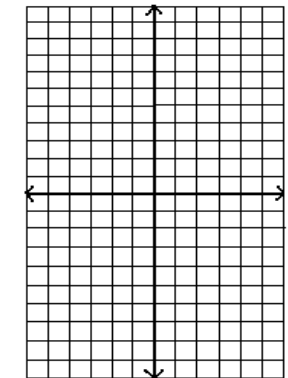


10. Double the parent graph pattern to graph:  $y = 2x^2 - 5$



12. Find the vertex of:  
 $y = 2x^2 + 8x + 5$

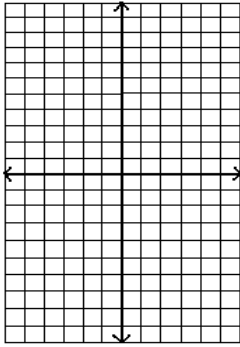
14. Now make a graph for the quadratic from # 12



Is the vertex a maximum or minimum value? \_\_\_\_\_  
Give the domain: \_\_\_\_\_  
Give the range: \_\_\_\_\_

# Algebra I – End of Course Review

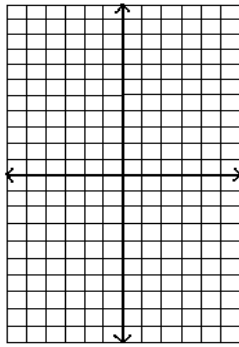
8. Graph the quadratic inequality:  $y > x^2 - 4$



Solving for Roots:

1.  $3x^2 - 5 = 13$
2.  $3x^2 - 6 = 54$
3.  $x^2 - 8x - 48 = 0$
4.  $8x^2 - 3x = 0$
5.  $2x^2 + 5x - 3 = 0$
6.  $x^2 - 8x + 5 = 0$
7.  $2x^2 + 6x - 3 = 0$

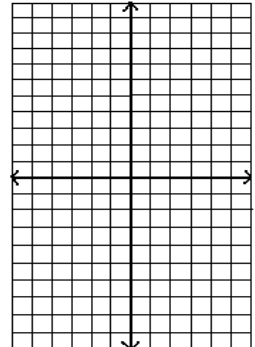
15. Graph the quadratic inequality:  $y < -x^2 + 1$



Solving for Roots:

1.  $2x^2 + 8 = 58$
3.  $2x^2 + 9 = 33$
5.  $x^2 + 14x + 45 = 0$
7.  $x^2 + 5x = 0$
9.  $5x^2 + 22x + 8 = 0$
11.  $x^2 + 14x + 8 = 0$
13.  $x^2 - 3x - 6 = 0$

16. Graph the quadratic inequality:  $y \geq -2x^2 + 6$



Solving for Roots:

2.  $4x^2 - 10x^2 + 7 = -17$
4.  $4x^2 - 2x^2 - 3 = 45$
6.  $x^2 - 10x + 21 = 0$
8.  $7x^2 - 4x = 0$
10.  $4x^2 + 11x = -7$
12.  $x^2 - 10x - 15 = 0$
14.  $2x^2 - 6x + 3 = 0$

# Algebra I – End of Course Review

8. How many solutions are there for the quadratic:  
 $y = 2x^2 - 7x + 3$

## Review of Rational Expressions

Review Together:

Simplify:

1.  $\frac{6x+12}{x+2}$

2.  $\frac{12m^2}{3m+6}$

3.  $\frac{x^2-9}{x^2-4x+3}$

4.  $\frac{8-m}{m^2-64}$

Multiply:

5.  $\frac{4m^2}{3m} \cdot \frac{2m}{6m^3}$

6.  $\frac{x+2}{8x} \cdot \frac{8x+16}{x^2-4}$

7.  $\frac{3x+2}{2x+4} \cdot (x^2+5x+6)$

9. How many roots are there for the quadratic:  
 $y = x^2 + 4x + 4$

## (Unit 11)

Practice:

Simplify:

1.  $\frac{4m-2}{2m-1}$

3.  $\frac{7p^3}{14p+28}$

5.  $\frac{x^2-25}{x^2+x-20}$

7.  $\frac{5-x}{x^2-8x+15}$

Multiply:

9.  $\frac{7x^5}{9m} \cdot \frac{6m}{14x^3}$

11.  $\frac{x^2-9}{6x} \cdot \frac{3x-24}{x^2-5x-24}$

13.  $\frac{2v}{v+3} \cdot (v^2-2v-15)$

10. How many times does the graph of this quadratic cross the x-axis:  
 $y = x^2 + 3x + 5$

Simplify:

2.  $\frac{t+5}{4t+20}$

4.  $\frac{10x^2}{2x^2-14x}$

6.  $\frac{x^2-3x-10}{x^2-4}$

8.  $\frac{3-p}{4p-12}$

Multiply:

10.  $\frac{10w^4}{6w^5} \cdot \frac{12w^7}{5w}$

12.  $\frac{x^2+x-20}{x^2-16} \cdot \frac{3x+9}{3x^2+15x}$

14.  $\frac{4m+4}{m^2-1} \cdot (m-1)$

# Algebra I – End of Course Review

Divide:

$$8. \frac{5m+10}{28m-40} \div \frac{7m+14}{14m-20}$$

$$9. \frac{y+2}{y+3} \div (y+2)$$

Add:

$$10. \frac{2x}{3x+15} + \frac{10}{3x+15}$$

$$11. \frac{6x}{x-2} - \frac{12}{x-2}$$

$$12. \frac{2x}{2x-10} - \frac{x+5}{2x-10}$$

$$13. \frac{1}{4} - \frac{3}{2x}$$

$$14. \frac{5}{p+2} + \frac{6}{p-3}$$

Subtract:

$$15. \frac{x-2}{x^2+5x+6} - \frac{3}{x+3}$$

Divide:

$$15. \frac{3x+12}{4x} \div \frac{x+4}{2x^2}$$

$$17. \frac{x-3}{y-2} \div (x^2+2x-15)$$

Add:

$$19. \frac{x}{x^2+4x+3} + \frac{1}{x^2+4x+3}$$

$$21. \frac{2x}{x^2-x-20} - \frac{10}{x^2-x-20}$$

$$23. \frac{x^2}{8x-24} - \frac{7x-12}{8x-24}$$

$$25. \frac{x}{5} - \frac{2}{3x}$$

$$27. \frac{3}{m+1} + \frac{2}{m+5}$$

Subtract:

$$29. \frac{2x}{3x+3} - \frac{2}{x+1}$$

Divide:

$$16. \frac{x^2-9}{7x-21} \div \frac{5x+15}{14x-21}$$

$$18. \frac{x^2-4}{x-2} \div (x^2+7x+10)$$

Add:

$$20. \frac{x^2}{4x+12} + \frac{9x+18}{4x+12}$$

$$22. \frac{x^2}{x-5} - \frac{25}{x-5}$$

$$24. \frac{2x^2+5}{x^2-5x-14} - \frac{x^2+9}{x^2-5x-14}$$

$$26. \frac{x^2}{6x} - \frac{3}{2x}$$

$$28. \frac{5}{x-4} + \frac{3}{x-2}$$

Subtract:

$$30. \frac{x}{5} - \frac{x+7}{x+3}$$

# Algebra I – End of Course Review

## Word Problems Review:

Review Together:

1. Five less than twice a number is 9. Find the number.
2. Four times the sum of a number and two is 28. Find the number.
3. Five more than a number is the same as twice the number decreased by two. Find the number.
4. Three consecutive numbers have a sum of 18. What are the numbers?
5. Three consecutive **odd** numbers have a sum of 27. What are the numbers?
6. A larger number is three less than four times a smaller number. If their sum is 32, find the numbers.

(All Chapters) Practice:

1. Seven more than three times a number is 19. Find the number.
2. Four less than half a number is 7. Find the number.
3. Twice the sum of a number and six is 18. Find the number.
4. Three times the difference of a number and four is  $-9$ . Find the number.
5. Six less than twice a number is the same as the number increased by seven. Find the number.
6. Two more than three times a number is the same eight less than twice the number. Find the number.
7. Three consecutive numbers have a sum of 159. What are the numbers?
8. Three consecutive numbers have a sum of  $-27$ . What are the numbers?
9. Four consecutive **odd** numbers have a sum of 51. What are the numbers?
10. Three consecutive **even** numbers have a sum of  $-60$ . What are the numbers?
11. A greater number is seven less than five times a smaller number. If their sum is 41, find the numbers.
12. A larger number is five more than twice a smaller number. If their sum is 23, find the numbers.

## Algebra I – End of Course Review

- |  |   |   |
|--|---|---|
| 7. The length of a rectangle is two centimeters more than three times the width. If the perimeter is 36cm, find the width and length.  | 13. The length of a rectangle is five centimeters less than four times the width. If the perimeter is 50cm, find the width and length.  | 14. The length of a rectangle is six centimeters more than the width. If the perimeter is 60cm, find the width and length.  |
| 8. Three more than six times a number is <u>at least</u> 21. Find the smallest possible answer that makes this true.   | 15. Six less than five times a number is <u>at least</u> 29. Find the largest possible answer that makes this true.   | 16. One more than twice a number is <u>at least</u> -15. Find the smallest possible answer that makes this true.  |
| 9. Nine less than twice a number is <u>at most</u> 19. Find the largest possible answer that makes this true.  | 17. Four more than twice a number is <u>at most</u> 14. Find the largest possible answer that makes this true.  | 18. Seven less than half a number is <u>at most</u> 3. Find the largest possible answer that makes this true.   |
| 10. Amanda opens a bank account with 23 dollars and saves \$5 dollars a week. Her brother gets 100 dollars for his birthday, but spends 6 dollars a week. How many weeks until they have the same amount of money and how much will that be? | 19. One wrestler weighed 106 pounds at the start of the season and had to <u>gain</u> 2 pounds a week. Another wrestler weighed 160 pounds and had <u>lose</u> 4 pounds a week. How many weeks until the wrestlers weigh the same and what will that weight be? | 20. A plane flying at an altitude of 4200 feet starts to descend at a rate of 250 feet per second. A second plane starts at an altitude of 2700 feet and starts to ascend at a rate of 125 feet per second. How many seconds until the planes are flying at the same altitude and what altitude will that be? |

## Algebra I – End of Course Review

11. Adult tickets to a play are \$12, student tickets are only \$8. If a theater sells 90 tickets to a play for a total of \$980, how many of each kind of ticket did the theater sell?

12. Jessica had 15 coins in her piggy bank, all dimes and quarters. If they totaled \$3.60, how many were dimes and how many were quarters?

\*For the next two problems use:  
 $h = -16t^2 + vt + c$

13. If a ball is kicked up at a velocity of 32 miles per second from a height of 4 feet, how many seconds until the ball reaches maximum height and what will that height be?

21. Lisa is selling candles and soap for a fundraiser. She sells a total of 24 items for a total of \$112. If the candles sold for \$4 each and the soap sold for \$5 each, how many of each did she sell?

23. Dylan looked in the couch for loose change. He found 22 nickels and quarters totaling \$4.30. How many were nickels and how many were quarters?

\*For the next four problems use:  
 $h = -16t^2 + vt + c$

25. If a cannonball is fired at a velocity of 160 miles per second from a height of 2 feet, how many seconds until the ball reaches maximum height and what will that height be?

22. Gizmos cost \$2 to ship and widgets cost \$3 to ship. If a company is shipping 50 gizmos and widgets for \$122, how many are gizmos and how many are widgets?

24. The tooth fairy left little Jenny 12 coins, all nickels and dimes totaling .95¢. How many coins were nickels and how many were dimes?

26. If a rocket is launched at a velocity of 96 miles per second from a 10 foot platform, how many seconds until the rocket reaches maximum height and what will that height be?

## Algebra I – End of Course Review

14. If an egg is thrown up and off the roof of a 100 foot building with an initial upward velocity of 10 feet per second, how long until it hits the ground?

15. A clerk mixed \$3 a pound almonds with \$5 a pound cashews to make 10 pounds of a mixture worth \$4.50 a pound. How many pounds of each nut did he use?

16. If Jasmine can wash the car in 30 minutes and Amanda can wash the car in 20 minutes. How long will it take them working together?

27. If a model rocket is launched from a 20 foot high platform at an initial upward velocity of 20 feet per second, how long until it crashes back to earth?

28. A scientist mixed some 10% acid solution with some 40% acid solution to make 600ml of 20% acid solution. How much of each did she use?

31. If Michael can load a truck in 10 hours and Daniel can load the truck in 8 hours. How long will it take them working together?

28. If a cannon ball is fired from a 40 foot cliff at an initial upward velocity of 30 feet per second, how long until it falls into the ocean?

30. \*Challenge: If 4 gallons of 10% salt solution is added to 6 gallons of 20% salt solution what percent salt will the mixture be?

24. If Jesse can paint a house in seven hours and Billy can paint the house in nine hours. How long will it take them working together?



## Algebra I – End of Course Review

17. Plane A leaves the airport traveling at 540 mph. Plane B follows 2 hours later at 630 mph. How long will Plane A have been flying when Plane B catches up?

18. A plane flies from LA to Denver at an average speed of 240 mph. It returns to LA at an average speed of 360 mph. If the entire trip took 5 hours how long did it take to fly to Denver?

19. Plane A leaves the airport going West at 280 mph. At the same time, Plane B leaves the airport going East at 360 mph. How long until the planes are 1600 miles apart?

33. Train A leaves the station traveling at 120 mph. Train B follows 3 hours later at 150 mph. How long will Train A have traveled when Train B catches up?

35. Joey takes a train from San Diego to Sacramento and travels at 120 mph. She take a car home and travels at an average of 80 miles per hour. If the entire trip took 10 hours, how long did it take him to drive home?

37. Train A leaves the station going North at 120 mph. An hour later, Train B leaves the station going South at 100 miles an hour. How long until the trains are 1000 miles apart?

34. A sailboat leaves port traveling at 20 mph. A jet boat follows 4 hours later traveling at 100 mph. How long does it take the jet boat to catch up?

36. Lisa leaves her campsite in her motorboat and travels up river at only 30 mph. Then she returns downstream at 50 mph. If the entire trip took 8 hours, how long did it take her to go up river?

38. A motor boat leaves the city of Luxor going up the Nile at 35 miles an hour. Three hours later, a jet boat leaves Luxor going down river at 80 miles an hour. How long until the boats are 910 miles apart?

# Algebra I – End of Course Review

## Properties and PEMDAS

1. Name the property shown:

$$a + b + c = b + a + c$$

Commutative prop. of addition

2. Name the property shown:

$$a(b + c) = ab + ac$$

distributive property

3. Name the property shown:

$$(a + b) + c = a + (b + c)$$

associative prop. of addition

4. Name the property shown:

$$a + 0 = a$$

identity prop. of addition

5. Simplify using PEMDAS

$$30 - 2 \cdot 3^2 + 5$$

$$30 - 2 \cdot 9 + 5$$

$$30 - 18 + 5$$

$$12 + 5 = 17$$

6. Simplify using PEMDAS

$$20 - 3(4 + 1) \div 5$$

$$20 - 3(5) \div 5$$

$$20 - 15 \div 5$$

$$20 - 3$$

$$17$$

## Solving Equations

Review Together:

1.  $5 - x = -6$

$$\begin{array}{r} 5 - x = -6 \\ -5 \quad -5 \\ \hline -x = -11 \\ x = 11 \end{array}$$

2.  $1p + 26 - 10p = -1$

$$\begin{array}{r} 1p + 26 - 10p = -1 \\ -9p + 26 = -1 \\ -26 \quad -26 \\ \hline -9p = -27 \\ p = 3 \end{array}$$

## (Unit 1)

1. Name the property shown:

$$a(b) = b(a)$$

commutative prop. of mult.

3. Name the property shown:

$$a \cdot 1 = a$$

identity prop. of multiplication

5. Name the property shown:

$$a \cdot b = b \cdot a$$

commutative prop. of multiplication

7. Name the property shown:

$$abc = cab$$

commutative prop. of multiplication

9. Simplify using PEMDAS

$$2(5 - 2 + 1)^2 - 6$$

$$2(3 + 1)^2 - 6$$

$$2(4)^2 - 6$$

$$2(16) - 6$$

$$32 - 6 = 26$$

11. Simplify using PEMDAS

$$(-3)^2 - 7 + 10 \cdot 2$$

$$9 - 7 + 20$$

$$2 + 20$$

$$22$$

## (Unit 2)

Homework:

1.  $25 = -35 - x$

$$\begin{array}{r} 25 = -35 - x \\ +35 \quad +35 \\ \hline 60 = -x \\ -1 \quad -1 \\ \hline -60 = x \end{array}$$

3.  $6m - 2 - 9m = 1$

$$\begin{array}{r} 6m - 2 - 9m = 1 \\ -3m - 2 = 1 \\ +2 \quad +2 \\ \hline -3m = 3 \\ -3 \quad -3 \\ \hline m = -1 \end{array}$$

2. Name the property shown:

$$m + 0 = m$$

identity prop. of addition

4. Name the property shown:

$$(a \cdot b) \cdot c = a \cdot (b \cdot c)$$

associative prop. of multiplication

6. Name the property shown:

$$a + (-a) = 0$$

inverse property of addition

8. Name the property shown:

$$a \cdot 0 = 0$$

zero property of multiplication

10. Simplify using PEMDAS

$$2(8 + 1) - 6 \div 2$$

$$2(9) - 3$$

$$18 - 3$$

$$15$$

12. Simplify using PEMDAS

$$9 + 24 \div (2)^3 \cdot 3$$

$$9 + 24 \div 8 \cdot 3$$

$$9 + 3 \cdot 3$$

$$9 + 9$$

$$18$$

# Algebra I – End of Course Review

$$3. \quad 5x - 2(x+4) = 28$$

$$\begin{array}{r} 5x - 2x - 8 = 28 \\ 3x - 8 = 28 \\ +8 \quad +8 \\ \hline 3x = 36 \end{array}$$

$$x = 12$$

$$4. \quad -\frac{1}{3}x + 6 = -8$$

$$\begin{array}{r} -\frac{1}{3}x + 6 = -8 \\ -6 \quad -6 \\ \hline -\frac{1}{3}x = -14 \end{array}$$

$$(-3) \cdot -\frac{1}{3}x = -14 \cdot (-3)$$

$$x = 42$$

$$5. \quad 7x + 19 = -2x + 55$$

$$\begin{array}{r} 7x + 19 = -2x + 55 \\ +2x \quad -19 \quad -19 \\ \hline 9x = 36 \end{array}$$

$$\frac{9x}{9} = \frac{36}{9}$$

$$x = 4$$

$$6. \quad x + \frac{4}{3} = -\frac{2}{3}x - 2$$

$$\begin{array}{r} 3x + 4 = -2x - 6 \\ +2x \quad -4 \quad -4 \\ \hline 5x = -10 \end{array}$$

$$\frac{5x}{5} = \frac{-10}{5}$$

$$x = -2$$

$$7. \quad \frac{x}{3} = \frac{6}{11}$$

$$\frac{11x}{11} = \frac{6}{11}$$

$$x = \frac{6}{11}$$

$$8. \quad \frac{x+3}{2} = \frac{x-2}{5}$$

$$\begin{array}{r} 2(x-2) = 5(x+3) \\ 2x - 4 = 5x + 15 \\ -5x \quad -4 \quad +4 \\ \hline -3x = 19 \end{array}$$

$$\frac{-3x}{-3} = \frac{19}{-3}$$

$$x = -6\frac{1}{3}$$

$$5. \quad 4x - 3(x-2) = 21$$

$$\begin{array}{r} 4x - 3x + 6 = 21 \\ x + 6 = 21 \\ -6 \quad -6 \\ \hline x = 15 \end{array}$$

$$7. \quad \frac{1}{7} + \frac{2}{3}x = -1$$

$$\begin{array}{r} \frac{1}{7} + \frac{2}{3}x = -1 \\ -\frac{1}{7} \quad -\frac{1}{7} \\ \hline \frac{2}{3}x = -\frac{8}{7} \end{array}$$

$$\left(\frac{3}{2}\right) \cdot \frac{2}{3}x = -\frac{8}{7} \left(\frac{3}{2}\right)$$

$$x = -\frac{24}{7}$$

$$x = -12$$

$$9. \quad 6x + 22 = -3x + 31$$

$$\begin{array}{r} 6x + 22 = -3x + 31 \\ +3x \quad -22 \quad -22 \\ \hline 9x = 9 \end{array}$$

$$\frac{9x}{9} = \frac{9}{9}$$

$$x = 1$$

$$11. \quad \frac{1}{2}x + 1 = \frac{3}{2}x - \frac{1}{2}$$

$$\begin{array}{r} x + 2 = 3x - 1 \\ -3x \quad -2 \quad -2 \\ \hline -2x = -3 \end{array}$$

$$\frac{-2x}{-2} = \frac{-3}{-2}$$

$$x = \frac{3}{2}$$

$$13. \quad \frac{5}{3}x = \frac{35}{3}$$

$$\frac{3x}{3} = \frac{35}{3}$$

$$x = 11\frac{2}{3}$$

$$15. \quad \frac{x+4}{x-1} = \frac{6}{9}$$

$$\begin{array}{r} 6(x-1) = 9(x+4) \\ 6x - 6 = 9x + 36 \\ -9x \quad -6 \quad +6 \\ \hline -3x = 42 \end{array}$$

$$\frac{-3x}{-3} = \frac{42}{-3}$$

$$x = -14$$

$$6. \quad 2x - 5(x-9) = 27$$

$$\begin{array}{r} 2x - 5x + 45 = 27 \\ -3x + 45 = 27 \\ -45 \quad -45 \\ \hline -3x = -18 \end{array}$$

$$\frac{-3x}{-3} = \frac{-18}{-3}$$

$$x = 6$$

$$8. \quad 22 = 18 - \frac{1}{4}x$$

$$\begin{array}{r} 22 = 18 - \frac{1}{4}x \\ -18 \quad -18 \\ \hline -\frac{1}{4}x = -4 \end{array}$$

$$\left(\frac{-4}{1}\right) \cdot -\frac{1}{4}x = -4 \cdot \left(\frac{-4}{1}\right)$$

$$-16 = x$$

$$10. \quad 12p - 7 = -3p + 8$$

$$\begin{array}{r} 12p - 7 = -3p + 8 \\ +3p \quad -7 \quad -7 \\ \hline 15p = 15 \end{array}$$

$$\frac{15p}{15} = \frac{15}{15}$$

$$p = 1$$

$$12. \quad 4 - \frac{2}{3}x = -\frac{5}{3}x - 3$$

$$\begin{array}{r} 12 - 2x = -5x - 9 \\ +5x \quad -12 \quad -12 \\ \hline 3x = -15 \end{array}$$

$$\frac{3x}{3} = \frac{-15}{3}$$

$$x = -5$$

$$14. \quad \frac{6}{7}x = \frac{30}{7}$$

$$\frac{1x}{1} = \frac{30}{7}$$

$$x = 4\frac{2}{7}$$

$$16. \quad \frac{x+1}{7} = \frac{x-3}{2}$$

$$\begin{array}{r} 2(x-3) = 7(x+1) \\ 2x - 6 = 7x + 7 \\ -7x \quad -6 \quad +6 \\ \hline -5x = 13 \end{array}$$

$$\frac{-5x}{-5} = \frac{13}{-5}$$

$$x = -2\frac{3}{5}$$

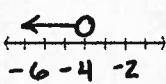
# Algebra I – End of Course Review

## Inequalities

Review Together:

1.  $-(x+8) > 2x+4$

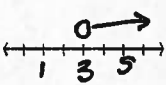
$$\begin{array}{r} -x-8 > 2x+4 \\ -2x \quad \swarrow \quad \nwarrow +8 \\ \hline \end{array}$$

$$\frac{-3x}{-3} > \frac{12}{-3} \quad \leftarrow 0$$


$x < -4$

2.  $-7 < 6x-25$

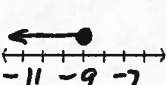
$$\begin{array}{r} -7 < 6x-25 \\ +25 \quad +25 \\ \hline \end{array}$$

$$\frac{18}{6} < \frac{6x}{6}$$


$x > 3$

3.  $12 \leq -2x-6$

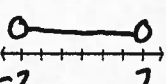
$$\begin{array}{r} 12 \leq -2x-6 \\ +6 \quad +6 \\ \hline \end{array}$$

$$\frac{18}{-2} \leq \frac{-2x}{-2}$$


$x \leq -9$

4.  $-10 < 2x-6 < 8$

$$\begin{array}{r} -10 < 2x-6 < 8 \\ +6 \quad +6 \quad +6 \\ \hline \end{array}$$

$$\frac{-4}{2} < \frac{2x}{2} < \frac{14}{2}$$


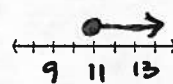
$-2 < x < 7$

## (Unit 3)

Homework:

1.  $x+3 \leq 2(x-4)$

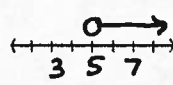
$$\begin{array}{r} x+3 \leq 2x-8 \\ -2x \quad \swarrow \quad \nwarrow -3 \\ \hline \end{array}$$

$$\frac{-x}{-1} \leq \frac{-11}{-1}$$


$x \geq 11$

3.  $-6+5x > 19$

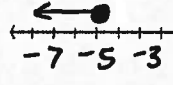
$$\begin{array}{r} -6+5x > 19 \\ +6 \quad +6 \\ \hline \end{array}$$

$$\frac{5x}{5} > \frac{25}{5}$$


$x > 5$

5.  $-x+9 \geq 14$

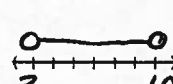
$$\begin{array}{r} -x+9 \geq 14 \\ -9 \quad -9 \\ \hline \end{array}$$

$$\frac{-x}{-1} \geq \frac{5}{-1}$$


$x \leq -5$

7.  $8 < 3x+2 < 32$

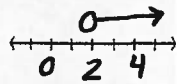
$$\begin{array}{r} 8 < 3x+2 < 32 \\ -2 \quad -2 \quad -2 \\ \hline \end{array}$$

$$\frac{6}{3} < \frac{3x}{3} < \frac{30}{3}$$


$2 < x < 10$

2.  $-x-4 < 3(x-4)$

$$\begin{array}{r} -x-4 < 3x-12 \\ -3x \quad \swarrow \quad \nwarrow +4 \\ \hline \end{array}$$

$$\frac{-4x}{-4} < \frac{-8}{-4}$$


$x > 2$

4.  $-17 > 5x-2$

$$\begin{array}{r} -17 > 5x-2 \\ +2 \quad +2 \\ \hline \end{array}$$

$$\frac{-15}{5} > \frac{5x}{5}$$


$x < -3$

6.  $7-3x < 16$

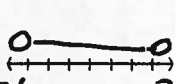
$$\begin{array}{r} 7-3x < 16 \\ -7 \quad -7 \\ \hline \end{array}$$

$$\frac{-3x}{-3} < \frac{9}{-3}$$


$x > -3$

8.  $13 > -2x+1 > -5$

$$\begin{array}{r} 13 > -2x+1 > -5 \\ -1 \quad -1 \quad -1 \\ \hline \end{array}$$

$$\frac{12}{-2} > \frac{-2x}{-2} > \frac{-6}{-2}$$


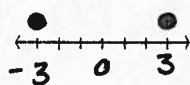
$-6 < x < 3$

## Absolute Value

Solve and graph and write the final answer:

1.  $4|x|+8=20$

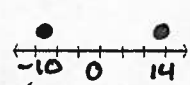
$$\begin{array}{r} 4|x|+8=20 \\ -8 \quad -8 \\ \hline \end{array}$$

$$\frac{4|x|}{4} = \frac{12}{4}$$


$|x| = 3$

2.  $|x-2|+8=20$

$$\begin{array}{r} |x-2|+8=20 \\ -8 \quad -8 \\ \hline \end{array}$$

$$|x-2| = 12$$


$$\begin{array}{r} x-2 = -12 \\ +2 \quad +2 \\ \hline \end{array}$$

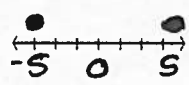
$$\begin{array}{r} x-2 = 12 \\ +2 \quad +2 \\ \hline \end{array}$$

$x = -10$        $x = 14$

## (Unit 3 Continued)

1.  $-2|x|+7=-3$

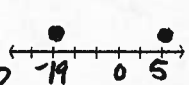
$$\begin{array}{r} -2|x|+7=-3 \\ -7 \quad -7 \\ \hline \end{array}$$

$$\frac{-2|x|}{-2} = \frac{-10}{-2}$$


$|x| = 5$

3.  $|x+7|-2=10$

$$\begin{array}{r} |x+7|-2=10 \\ +2 \quad +2 \\ \hline \end{array}$$

$$|x+7| = 12$$


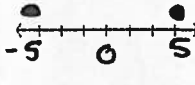
$$\begin{array}{r} x+7 = -12 \\ -7 \quad -7 \\ \hline \end{array}$$

$$\begin{array}{r} x+7 = 12 \\ -7 \quad -7 \\ \hline \end{array}$$

$x = -19$        $x = 5$

2.  $3|x|-8=7$

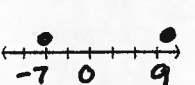
$$\begin{array}{r} 3|x|-8=7 \\ +8 \quad +8 \\ \hline \end{array}$$

$$\frac{3|x|}{3} = \frac{15}{3}$$


$|x| = 5$

4.  $|x-1|-3=5$

$$\begin{array}{r} |x-1|-3=5 \\ +3 \quad +3 \\ \hline \end{array}$$

$$|x-1| = 8$$


$$\begin{array}{r} x-1 = 8 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\begin{array}{r} x-1 = -8 \\ +1 \quad +1 \\ \hline \end{array}$$

$x = 9$        $x = -7$

# Algebra I – End of Course Review

3.  $2|x| + 2 < 20$   
 $\frac{-2}{-2} \frac{-2}{-2}$   
 $2|x| < 18$   
 $\frac{2}{2} \frac{2}{2}$   
 $|x| < 9$   
 $-9 < x < 9$

5.  $2|x| + 1 < 11$   
 $\frac{-1}{-1} \frac{-1}{-1}$   
 $2|x| < 10$   
 $\frac{2}{2} \frac{2}{2}$   
 $|x| < 5$   
 $-5 < x < 5$

6.  $4|x| - 2 \leq 22$   
 $\frac{+2}{+2} \frac{+2}{+2}$   
 $4|x| \leq 20$   
 $\frac{4}{4} \frac{4}{4}$   
 $|x| \leq 5$   
 $-5 \leq x \leq 5$

4.  $2|x| - 6 > 4$   
 $\frac{+6}{+6} \frac{+6}{+6}$   
 $2|x| > 10$   
 $\frac{2}{2} \frac{2}{2}$   
 $|x| > 5$   
 $x < -5 \text{ or } x > 5$

7.  $|x| - 2 > 8$   
 $\frac{+2}{+2} \frac{+2}{+2}$   
 $|x| > 10$   
 $x < -10 \text{ or } x > 10$

8.  $|x| - 3 \geq 4$   
 $\frac{+3}{+3} \frac{+3}{+3}$   
 $|x| \geq 7$   
 $x < -7 \text{ or } x > 7$

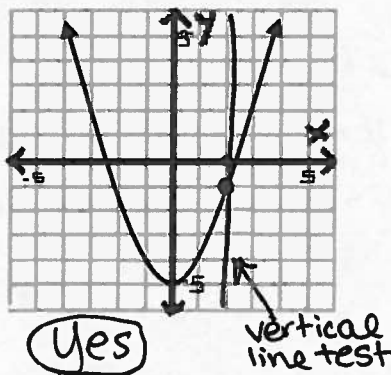
## Recognizing Functions

1. Give the function rule of the table:

x	f(x)
-2	-9
-1	-4
0	1
1	6
2	11

$y = 5x + 1$

2. Is the graph a function?



3. Give the domain and range of the following set of points:

(3, 7) (-2, 5) (-8, -1) (-2, 3)

Domain:  $\{-8, -2, 3\}$

Range:  $\{-1, 3, 5, 7\}$

Is the relation a function? No

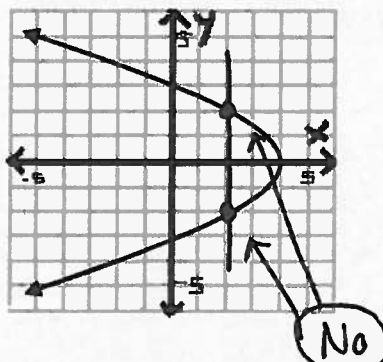
## (Unit 4)

1. Give the function rule of the table:

x	y
-2	-7
-1	-4
0	-1
1	2
2	5

$y = 3x - 1$

3. Is the graph a function?



5. Give the domain and range of the following set of points:

(3, 7) (1, 7) (6, -2) (-8, 2)

Domain:  $\{-8, 1, 3, 6\}$

Range:  $\{-2, 2, 7\}$

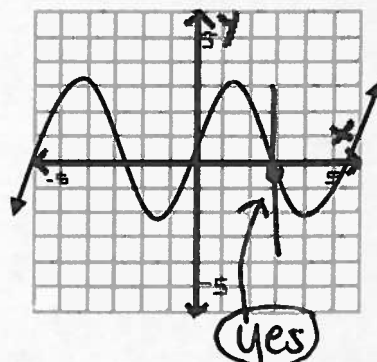
Is the relation a function? yes

2. Give the function rule of the table:

x	f(x)
-2	1
-1	2
0	3
1	4
2	5

$y = x + 3$

4. Is the graph a function?



6. Give the domain and range of the following set of points:

(6, -1) (-4, 3) (-7, -2) (6, -5)

Domain:  $\{-7, -4, 6\}$

Range:  $\{-5, -2, -1, 3\}$

Is the relation a function? No

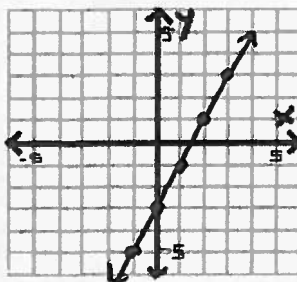
# Algebra I – End of Course Review

## Basic Linear Graphing

Review Together:

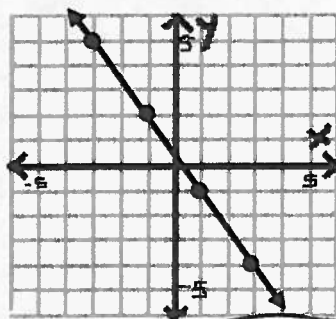
1. Complete the table and graph from the equation:

$$y = 2x - 3$$



x	y
-3	-9
-2	-7
-1	-5
0	-3
1	-1
2	1
3	3

2. Give the slope of the line:

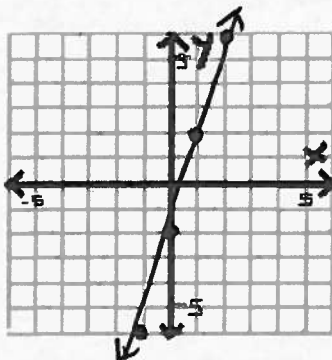


$$m = -3/2$$

3. Solve for y and name the slope and y-intercept:

$$\begin{aligned} 3x - 2y &= 6 & m &= 3/2 \\ -3x & \quad -3x \\ \hline -2y &= -3x + 6 & b &= -3 \\ -2 & \quad -2 & & \\ \hline y &= 3/2 x - 3 \end{aligned}$$

4. Graph the following line from its slope and y-intercept:  $y = 4x - 2$

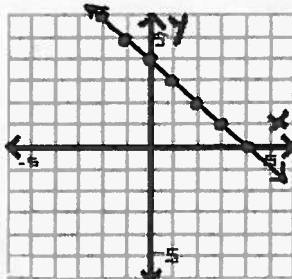


## (Unit 5)

Homework:

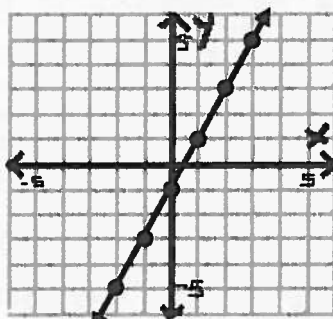
1. Complete the table and graph from the equation:

$$y = -x + 4$$



x	y
-3	7
-2	6
-1	5
0	4
1	3
2	2
3	1
4	0

3. Give the slope of the line:

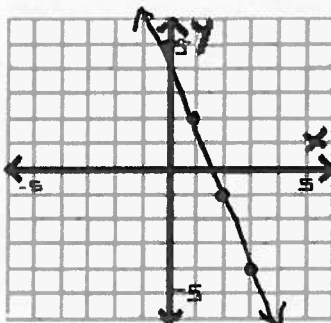


$$m = 2$$

5. Solve for y and name the slope and y-intercept:

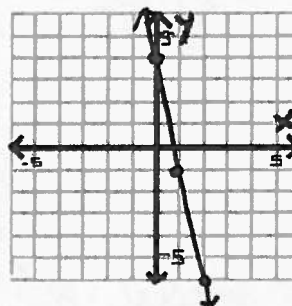
$$\begin{aligned} 2x + 4y &= -8 & m &= -1/2 \\ -2x & \quad -2x \\ \hline 4y &= -2x - 8 & b &= -2 \\ 4 & \quad 4 \\ \hline y &= -1/2 x - 2 \end{aligned}$$

7. Graph the following line from its slope and y-intercept:  $y = -3x + 5$



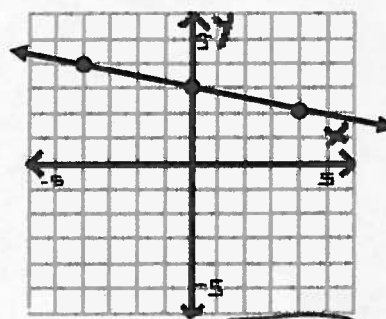
2. Complete the table and graph from the equation:

$$y = -5x + 4$$



x	y
-3	19
-2	14
-1	9
0	4
1	-1
2	-6
3	-11

4. Give the slope of the line:

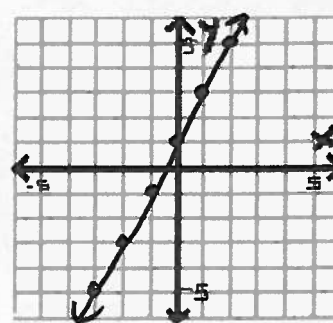


$$m = -1/4$$

6. Solve for y and name the slope and y-intercept:

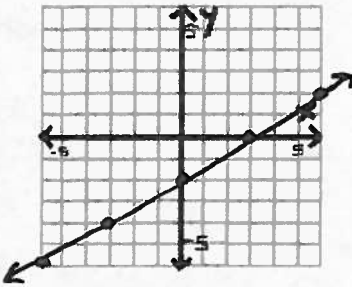
$$\begin{aligned} -5x - 3y &= -15 & m &= -5/3 \\ +5x & \quad +5x \\ \hline -3y &= 5x - 15 & b &= 5 \\ -3 & \quad -3 \\ \hline y &= -5/3 x + 5 \end{aligned}$$

8. Graph the following line from its slope and y-intercept:  $y = 2x + 1$

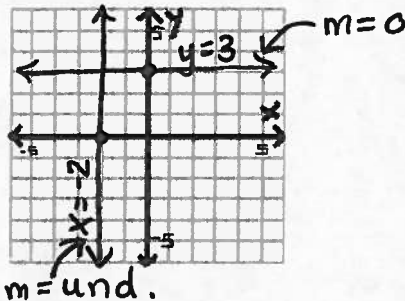


# Algebra I – End of Course Review

5. Graph the following line from its slope and y-intercept:  $y = \frac{2}{3}x - 2$



6. Graph  $y = 3$  and  $x = -2$  and name their slopes:



## Algebra with Linear Equations:

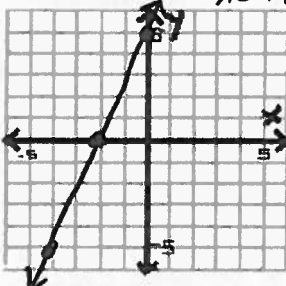
Review Together:

- Is the point  $(-2, -1)$  a solution to the equation:  $y = 3x - 5$   
 $-1 = 3(-2) - 5$   
 $-1 = -6 - 5$   
 $-1 = -11$   
**No!**
- Name the x and y intercepts of the equation:  
 $-3x + 2y = -12$

x	y
0	-6
4	0

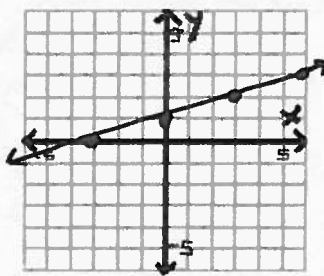
3. Graph from the x and y intercepts:

$$-5x + 2y - 10 = 0$$

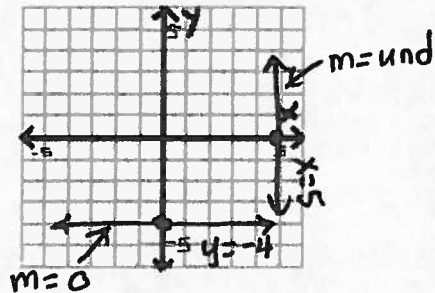


x	y
0	5
-2	0

9. Graph the following line from its slope and y-intercept:  $y = \frac{1}{3}x + 1$



11. Graph  $y = -4$  and  $x = 5$  and name their slopes:



## (Unit 5 Continued)

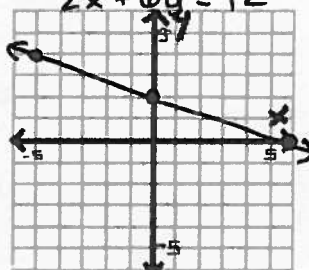
Homework:

- Is the point  $(-1, 3)$  a solution to the equation:  $y = -4x - 1$   
 $3 = -4(-1) - 1$   
 $3 = 4 - 1$   
 $3 = 3$   
**Yes!**
- Name the x and y intercepts of the equation:  
 $4x + 2y - 8 = 0$

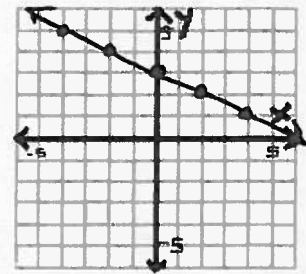
x	y
0	4
2	0

5. Graph from the x and y intercepts:

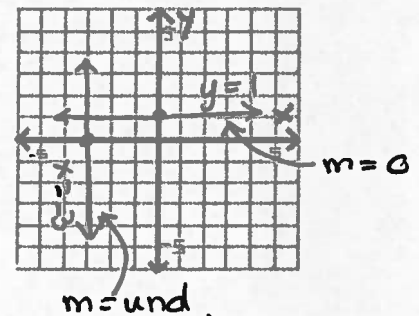
$$2x - 6y + 12 = 0$$



10. Graph the following line from its slope and y-intercept:  $y = -\frac{1}{2}x + 3$



12. Graph  $y = 1$  and  $x = -3$  and name their slopes:

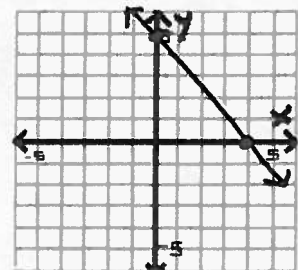


- Is the point  $(-2, 0)$  a solution to the equation:  $y = -2x + 4$   
 $0 = -2(-2) + 4$   
 $0 = 4 + 4$   
 $0 = 8$   
**No!**
- Name the x and y intercepts of the equation:  
 $5x - 3y = 15$

x	y
0	-5
3	0

6. Graph from the x and y intercepts:

$$-5x - 4y = -20$$





# Algebra I – End of Course Review

Review Together:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

4. Give the *slope* of the line that goes through the points:  
(-4, -1) and (5, -7)

$$m = \frac{-7 - (-1)}{5 - (-4)} = \frac{-7 + 1}{5 + 4} = \frac{-6}{9} = \frac{-2}{3}$$

5. Give the *slope* of the line that goes through the points:  
(-3, -1) and (2, -1)

$$m = \frac{-1 - (-1)}{2 - (-3)} = \frac{-1 + 1}{2 + 3} = \frac{0}{5} = 0$$

6. Give the *equation* of the line with a slope of 3 that goes through the point (2, -1)

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - (-1) &= 3(x - 2) \\ y + 1 &= 3x - 6 \\ y &= 3x - 7 \end{aligned}$$

7. Give the *equation* of the line that goes through the points:

$$\boxed{(1, 3)} \text{ and } (2, 5)$$

$$m = \frac{5 - 3}{2 - 1} = \frac{2}{1} = 2$$

$$\begin{aligned} y - 3 &= 2(x - 1) \\ y - 3 &= 2x - 2 \\ y + 3 &= 2x + 3 \\ y &= 2x + 1 \end{aligned}$$

8. Give the *equation* of the line that is **parallel** to the line  $y = -3x + 1$  and goes through (-5, -6).

$$m = -3$$

$$\begin{aligned} y - (-6) &= -3(x - (-5)) \\ y + 6 &= -3(x + 5) \\ y + 6 &= -3x - 15 \\ y &= -3x - 21 \end{aligned}$$

Homework:

7. Give the *slope* of the line that goes through the points:  
(-2, 5) and (4, -7)

$$m = \frac{-7 - 5}{4 - (-2)} = \frac{-12}{6} = -2$$

9. Give the *slope* of the line that goes through the points:  
(5, -2) and (5, 1)

$$m = \frac{1 - (-2)}{5 - 5} = \frac{1 + 2}{0} = \text{und.}$$

11. Give the *equation* of the line with a slope of 1/2 that goes through the point (4, 3)

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 3 &= \frac{1}{2}(x - 4) \\ y - 3 &= \frac{1}{2}x - 2 \\ y - 3 &= \frac{1}{2}x - 2 \\ y &= \frac{1}{2}x + 1 \end{aligned}$$

13. Give the *equation* of the line that goes through the points:

$$\boxed{(-2, 3)} \text{ and } (2, -5)$$

$$m = \frac{-5 - 3}{2 - (-2)} = \frac{-8}{4} = -2$$

$$\begin{aligned} y - 3 &= -2(x - (-2)) \\ y - 3 &= -2(x + 2) \\ y - 3 &= -2x - 4 \\ y &= -2x - 1 \end{aligned}$$

15. Give the *equation* of the line that is **parallel** to the line  $y = -4x - 6$  and goes through (1, 8).

$$m = -4$$

$$\begin{aligned} y - 8 &= -4(x - 1) \\ y - 8 &= -4x + 4 \\ y &= -4x + 12 \end{aligned}$$

8. Give the *slope* of the line that goes through the points:  
(0, 8) and (-1, 2)

$$m = \frac{2 - 8}{-1 - 0} = \frac{-6}{-1} = 6$$

10. Give the *slope* of the line that goes through the points:  
(5, 2) and (4, 2)

$$m = \frac{2 - 2}{4 - 5} = \frac{0}{-1} = 0$$

12. Give the *equation* of the line with a slope of -2 that goes through the point (-5, -7)

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - (-7) &= -2(x - (-5)) \\ y + 7 &= -2(x + 5) \\ y + 7 &= -2x - 10 \\ y &= -2x - 17 \end{aligned}$$

14. Give the *equation* of the line that goes through the points:

$$\boxed{(6, 2)} \text{ and } (8, -4)$$

$$m = \frac{-4 - 2}{8 - 6} = \frac{-6}{2} = -3$$

$$\begin{aligned} y - 2 &= -3(x - 6) \\ y - 2 &= -3x + 18 \\ y &= -3x + 20 \end{aligned}$$

16. Give the *equation* of the line that is **parallel** to the line  $y = -5x - 2$  and goes through the point (3, -9).

$$m = -5$$

$$\begin{aligned} y - (-9) &= -5(x - 3) \\ y + 9 &= -5x + 15 \\ y &= -5x + 6 \end{aligned}$$



# Algebra I – End of Course Review

## Review Together:

9. Give the *equation* of the line that is **perpendicular** to the line  $y = 3x - 2$  and goes through  $(6, 5)$ .

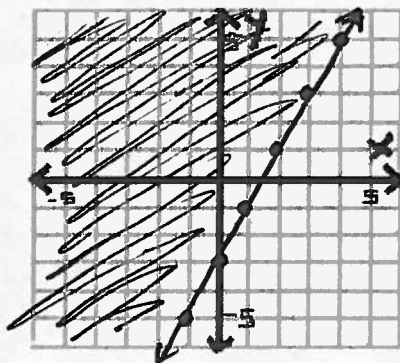
$$m = -\frac{1}{3}$$

$$y - 5 = -\frac{1}{3}(x - 6)$$

$$\begin{array}{r} y - 5 = -\frac{1}{3}x + 2 \\ +5 \quad +5 \\ \hline y = -\frac{1}{3}x + 7 \end{array}$$

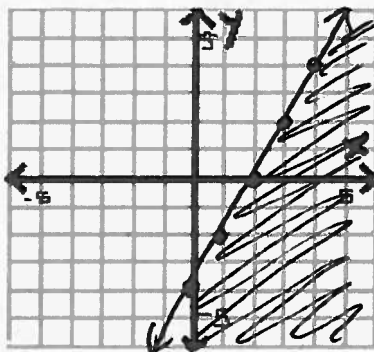
## Graphing Inequalities:

1. Graph the inequality:  
 $y > 2x - 3$



2. Graph the inequality:

$$\begin{array}{r} -\frac{1}{2}y \geq -\frac{4}{2}x + \frac{8}{2} \\ -\frac{1}{2} \quad -\frac{2}{2} \quad -\frac{2}{2} \\ \hline y \leq 2x - 4 \end{array}$$



## Homework:

17. Give the *equation* of the line that is **perpendicular** to the line  $y = -\frac{1}{4}x - 2$  and goes through  $(-1, 2)$ .

$$m = 4$$

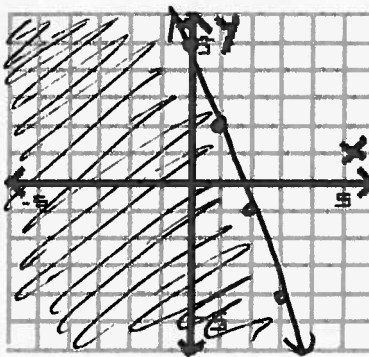
$$y - 2 = 4(x - (-1))$$

$$y - 2 = 4(x + 1)$$

$$\begin{array}{r} y - 2 = 4x + 4 \\ +2 \quad +2 \\ \hline y = 4x + 6 \end{array}$$

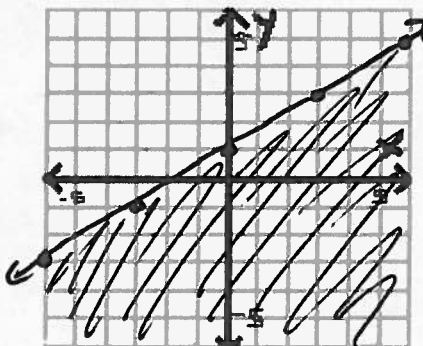
## (Unit 5 Continued)

1. Graph the inequality:  
 $y < -3x + 5$



3. Graph the inequality:

$$\begin{array}{r} 3y \leq 2x + 3 \\ \frac{3}{3} \quad \frac{2}{3} \quad \frac{3}{3} \\ \hline y \leq \frac{2}{3}x + 1 \end{array}$$



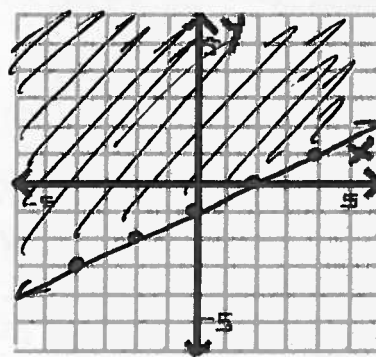
18. Give the *equation* of the line that is **perpendicular** to the line  $y = -2x + 4$  and goes through the point  $(4, -2)$ .

$$m = \frac{1}{2}$$

$$y - (-2) = \frac{1}{2}(x - 4)$$

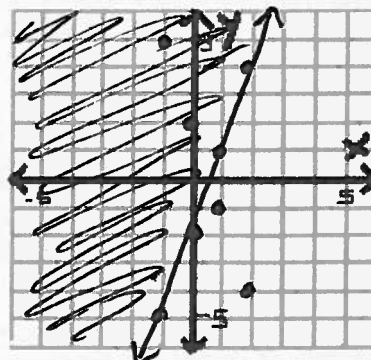
$$\begin{array}{r} y + 2 = \frac{1}{2}x - 2 \\ -2 \quad -2 \\ \hline y = \frac{1}{2}x - 4 \end{array}$$

2. Graph the inequality:  
 $y > \frac{1}{2}x - 1$



4. Graph the inequality:

$$\begin{array}{r} -y \leq -3x + 2 \\ -1 \quad -1 \quad -1 \\ \hline y \geq 3x - 2 \end{array}$$



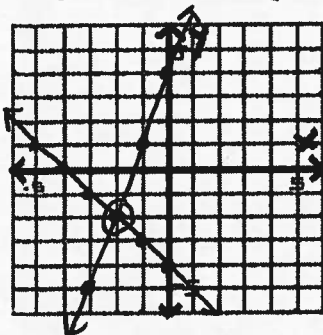
# Algebra I – End of Course Review

## Solving Systems of Equations:

Review Together:

1. Solve the following system of equations by graphing:

$$\begin{cases} y = -x - 4 \\ y = 3x + 4 \end{cases} \quad \text{Solution: } (-2, -2)$$



2. Solve the following system of equations by substitution:

$$\begin{cases} y = -3x + 5 \\ 2x - y = 10 \end{cases}$$

$$2x - (-3x + 5) = 10$$

$$2x + 3x - 5 = 10$$

$$5x - 5 = 10$$

$$5x = 15$$

$$x = 3$$

$$y = -3(3) + 5$$

$$y = -9 + 5$$

$$y = -4$$

$$\boxed{(3, -4)}$$

3. Solve the following system of equations by substitution:

$$\begin{cases} 3x + y = 3 \\ 7x + 2y = 1 \end{cases}$$

$$7x + 2(3 - 3x) = 1$$

$$7x + 6 - 6x = 1$$

$$x + 6 = 1$$

$$x = -5$$

$$y = 3 - 3(-5)$$

$$y = 3 + 15$$

$$y = 18$$

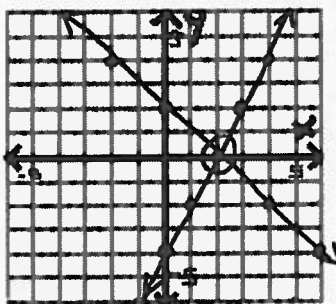
$$\boxed{(-5, 18)}$$

## (Unit 6)

Homework:

1. Solve the following system of equations by graphing:

$$\begin{cases} x + y = 2 \\ 2x - y = 4 \end{cases} \quad \text{Solution } (2, 0)$$



3. Solve the following system of equations by substitution:

$$\begin{cases} x = -2y + 4 \\ -x + y = -7 \end{cases}$$

$$-(-2y + 4) + y = -7$$

$$2y - 4 + y = -7$$

$$3y - 4 = -7$$

$$3y = -3$$

$$y = -1$$

$$x = -2(-1) + 4$$

$$x = 2 + 4$$

$$x = 6$$

$$\boxed{(6, -1)}$$

5. Solve the following system of equations by substitution:

$$\begin{cases} 2x + y = 4 \\ -x + y = 1 \end{cases}$$

$$-x + (4 - 2x) = 1$$

$$x + 4 - 2x = 1$$

$$-x + 4 = 1$$

$$-x = -3$$

$$x = 3$$

$$y = 4 - 2(3)$$

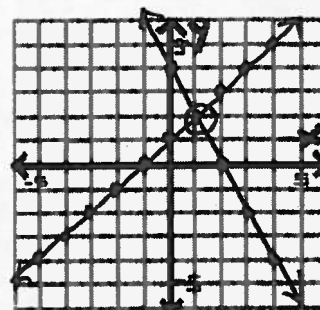
$$y = 4 - 6$$

$$y = -2$$

$$\boxed{(3, -2)}$$

2. Solve the following system of equations by graphing:

$$\begin{cases} 2x + y = 4 \\ -x + y = 1 \end{cases} \quad \text{Solution } (1, 2)$$



4. Solve the following system of equations by substitution:

$$\begin{cases} y = -x + 1 \\ 2x + y = -2 \end{cases}$$

$$2x + (-x + 1) = -2$$

$$2x - x + 1 = -2$$

$$x + 1 = -2$$

$$x = -3$$

$$y = -(-3) + 1$$

$$y = 3 + 1$$

$$y = 4$$

$$\boxed{(-3, 4)}$$

6. Solve the following system of equations by substitution:

$$\begin{cases} x + y = 4 \\ 4x + y = 1 \end{cases}$$

$$4x + (4 - x) = 1$$

$$4x + 4 - x = 1$$

$$3x + 4 = 1$$

$$3x = -3$$

$$x = -1$$

$$y = 4 - (-1)$$

$$y = 4 + 1$$

$$y = 5$$

$$\boxed{(-1, 5)}$$

# Algebra I – End of Course Review

4. Solve the following system of equations by elimination:

$$\begin{cases} x + 3y = 2 \\ -x + 2y = 3 \end{cases} \quad + \quad \begin{cases} x + 3(1) = 2 \\ x + 3 = 2 \\ -3 - 3 \end{cases}$$

$$\begin{array}{r} x + 3y = 2 \\ -x + 2y = 3 \\ \hline 5y = 5 \\ y = 1 \end{array}$$

$$\begin{array}{r} x + 3(1) = 2 \\ x + 3 = 2 \\ -3 - 3 \\ \hline x = -1 \end{array}$$

$(-1, 1)$

5. Solve the following system of equations by elimination:

$$\begin{cases} x + 2y = 5 \\ 3x - y = 3 \end{cases} \quad + \quad \begin{cases} (1) + 2y = 5 \\ -1 -1 \end{cases}$$

$$\begin{array}{r} x + 2y = 5 \\ 3x - y = 3 \\ \hline 10x - 2y = 6 \\ 11x = 11 \\ x = 1 \end{array}$$

$$\begin{array}{r} (1) + 2y = 5 \\ -1 -1 \\ \hline 2y = 4 \\ y = 2 \end{array}$$

$(1, 2)$

6. Solve the following system of equations by elimination:

$$\begin{cases} 3x + 5y = 19 \\ 24x + 40y = 152 \\ 4x - 8y = -4 \end{cases} \quad + \quad \begin{cases} 3(3) + 5y = 19 \\ 9 + 5y = 19 \\ -9 -9 \end{cases}$$

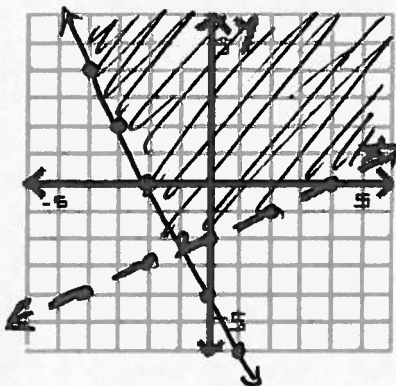
$$\begin{array}{r} 3x + 5y = 19 \\ 24x + 40y = 152 \\ 4x - 8y = -4 \\ \hline 20x - 40y = -20 \\ 44x = 132 \\ x = 3 \end{array}$$

$$\begin{array}{r} 3(3) + 5y = 19 \\ 9 + 5y = 19 \\ -9 -9 \\ \hline 5y = 10 \\ y = 2 \end{array}$$

$(3, 2)$

7. Solve the system of inequalities by graphing:

$$y \geq -2x - 4 \text{ and } y > \frac{1}{2}x - 2$$



7. Solve the following system of equations by elimination:

$$\begin{cases} 3x - 2y = 1 \\ 2x + 2y = 4 \end{cases} \quad + \quad \begin{cases} 2(1) + 2y = 4 \\ 2 + 2y = 4 \\ -2 -2 \end{cases}$$

$$\begin{array}{r} 3x - 2y = 1 \\ 2x + 2y = 4 \\ \hline 5x = 5 \\ x = 1 \end{array}$$

$$\begin{array}{r} 2(1) + 2y = 4 \\ 2 + 2y = 4 \\ -2 -2 \\ \hline 2y = 2 \\ y = 1 \end{array}$$

$(1, 1)$

9. Solve the following system of equations by elimination:

$$\begin{cases} 4(x - 5y - 20) \\ -4x + 20y = -80 \end{cases} \quad + \quad \begin{cases} x - 5(-2) = 20 \\ x + 10 = 20 \\ -10 -10 \end{cases}$$

$$\begin{array}{r} 4(x - 5y - 20) \\ -4x + 20y = -80 \\ \hline 4x + 3y = 34 \\ 23y = -46 \\ y = -2 \end{array}$$

$$\begin{array}{r} x - 5(-2) = 20 \\ x + 10 = 20 \\ -10 -10 \\ \hline x = 10 \end{array}$$

$(10, -2)$

11. Solve the following system of equations by elimination:

$$\begin{cases} 2x + 6y = 4 \\ 6x + 18y = 12 \\ 3x - 7y = 6 \end{cases} \quad + \quad \begin{cases} 2x + 6(0) = 4 \\ 2x + 0 = 4 \\ 2x = 4 \\ x = 2 \end{cases}$$

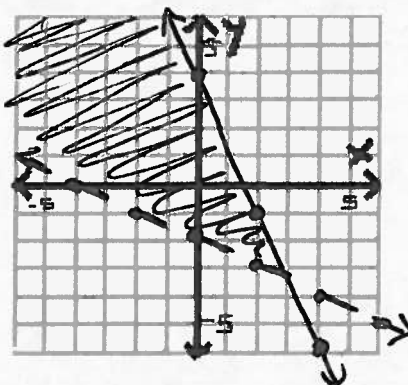
$$\begin{array}{r} 2x + 6y = 4 \\ 6x + 18y = 12 \\ 3x - 7y = 6 \\ \hline -6x + 14y = -12 \\ 32y = 0 \\ y = 0 \end{array}$$

$$\begin{array}{r} 2x + 6(0) = 4 \\ 2x + 0 = 4 \\ 2x = 4 \\ x = 2 \end{array}$$

$(2, 0)$

13. Solve the system of inequalities by graphing:

$$y \leq -\frac{5}{2}x + 4 \text{ and } y > -\frac{1}{2}x - 2$$



8. Solve the following system of equations by elimination:

$$\begin{cases} x + 3y = 12 \\ x - y = 30 \end{cases} \quad + \quad \begin{cases} (2)(1) + 3y = 12 \\ -2 -21 \end{cases}$$

$$\begin{array}{r} x + 3y = 12 \\ x - y = 30 \\ \hline 8x = 42 \\ x = 21 \end{array}$$

$$\begin{array}{r} (2)(1) + 3y = 12 \\ -2 -21 \\ \hline 3y = -9 \\ y = -3 \end{array}$$

$(21, -3)$

10. Solve the following system of equations by elimination:

$$\begin{cases} x + 2y = 1 \\ 2x + 4y = 2 \\ 5x - 4y = -23 \end{cases} \quad + \quad \begin{cases} (-3)(1) + 2y = 1 \\ -3 + 2y = 1 \\ +3 +3 \end{cases}$$

$$\begin{array}{r} x + 2y = 1 \\ 2x + 4y = 2 \\ 5x - 4y = -23 \\ \hline 7x = -21 \\ x = -3 \end{array}$$

$$\begin{array}{r} (-3)(1) + 2y = 1 \\ -3 + 2y = 1 \\ +3 +3 \\ \hline 2y = 4 \\ y = 2 \end{array}$$

$(-3, 2)$

12. Solve the following system of equations by elimination:

$$\begin{cases} 2x - 3y = 0 \\ 6x - 9y = 0 \\ 3x - 2y = 5 \end{cases} \quad + \quad \begin{cases} 2x - 3(2) = 0 \\ 2x - 6 = 0 \\ 2x - 6 = 0 \\ +6 +6 \end{cases}$$

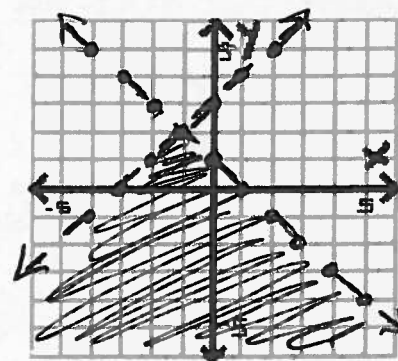
$$\begin{array}{r} 2x - 3y = 0 \\ 6x - 9y = 0 \\ 3x - 2y = 5 \\ \hline -6x + 4y = -10 \\ -5y = -10 \\ y = 2 \end{array}$$

$$\begin{array}{r} 2x - 3(2) = 0 \\ 2x - 6 = 0 \\ 2x - 6 = 0 \\ +6 +6 \\ \hline 2x = 6 \\ x = 3 \end{array}$$

$(3, 2)$

14. Solve the system of inequalities by graphing:

$$y < x + 3 \text{ and } y < -x + 1$$



# Algebra I – End of Course Review

## Exponent Rules Review:

Review Together:

1. Simplify:  $4^2 \cdot 4^3 = 4^5$
2. Simplify:  $n^3 \cdot n^3 \cdot n^4 = n^{10}$
3. Simplify:  $x^5 \cdot x^{-3} \cdot x^{-1} = x$
4. Simplify:  $(-4x^3y^2)^6$   
 $= 4^6 x^{18} y^{12} = 4096 x^{18} y^{12}$
5. Simplify:  $x^0 = 1$
6. Simplify:  $8^2 x^0 y^3 \cdot 8x^4 y^6$   
 $= 512 x^4 y^9$
7. Simplify:  $(3x^2y^3)^2 \cdot (2x^4y)^3$   
 $9x^4y^6 \cdot 8x^{12}y^3$   
 $= 72x^{16}y^9$
8. Simplify:  $x^2(3x^3)^4$   
 $x^2 \cdot 3^4 x^{12}$   
 $= 81x^{14}$
9. Simplify with positive exponents:  $3x^{-2}y^3z^{-4}x^3$   
 $3xy^3z^4 = \frac{3xy^3}{z^4}$
10. Simplify with positive exponents:  $\frac{2x^4y}{28x^2y^3}$   
 $= \frac{x^2}{2y^2}$
11. Simplify with positive exponents:  $\frac{x^3}{x^{-5}}$   
 $= x^3 \cdot x^5$   
 $= x^8$

## (Unit 7)

Homework:

1. Simplify:  $3^2 \cdot 3^3 \cdot 3^5 \cdot 3^5 = 3^{15}$
3. Simplify:  $g^5 \cdot g \cdot g^6 = g^{12}$
5. Simplify:  $m^2 \cdot m^{-2} \cdot m^6 = m^6$
7. Simplify:  $(-2x^4y^5)^5$   
 $= (-2)^5 x^{20} y^{25} = -32x^{20}y^{25}$
9. Simplify:  $p^0 = 1$
11. Simplify:  $3^3 m^2 p^{-1} \cdot 2m^3 p^5$   
 $= 18m^5 p^4$
13. Simplify:  $(2m^4p^5)^3 \cdot (5mp^2)^2$   
 $8m^{12}p^{15} \cdot 25m^2p^4$   
 $= 200m^{14}p^{19}$
15. Simplify:  $p^3 m(2p^5)^4$   
 $p^3 m \cdot 2^4 p^{20}$   
 $= 16p^{23}m$
17. Simplify with positive exponents:  $5g^5 m^2 g^4 m^{-6}$   
 $5g^9 m^{-4} = \frac{5g^9}{m^4}$
19. Simplify with positive exponents:  $\frac{2a^5b}{48a^2b^3}$   
 $= \frac{a^3}{4b^2}$
21. Simplify with positive exponents:  $\frac{m^3}{m^{-4}}$   
 $= m^3 \cdot m^4$   
 $= m^7$

2. Simplify:  $2^6 \cdot 2^9 = 2^{15}$
4. Simplify:  $x^3 \cdot x^5 \cdot x^4 = x^{12}$
6. Simplify:  $b^{-4} \cdot b^2 \cdot b^{-5} = b^{-7}$
8. Simplify:  $(-3x^3y^5)^2$   
 $= (-3)^2 x^6 y^{10} = 9x^6y^{10}$
10. Simplify:  $(10p^3)^0 = 1$
12. Simplify:  $5^2 a^3 b^5 \cdot 3a^4 b^2$   
 $= 75a^{12}b^7$
14. Simplify:  $(2a^5b^4)^2 \cdot (3a^2b)^5$   
 $4a^{10}b^8 \cdot 243a^{10}b^5$   
 $= 972a^{20}b^{13}$
16. Simplify:  $3a^5b^2(5a^2b^4)^3$   
 $3a^5b^2 \cdot 5^3 a^6 b^{12}$   
 $= 375a^{11}b^{14}$
18. Simplify with positive exponents:  $-9a^6b^{-3}c^{-8}a^4b^2c^3$   
 $-9a^{10}b^{-1}c^{-5} = -\frac{9a^{10}}{bc^5}$
20. Simplify with positive exponents:  $\frac{520m^4p^3y}{4m^8y^3}$   
 $= \frac{5p^3}{m^4y^2}$
22. Simplify with positive exponents:  $\frac{m^2p^{-6}x^3}{m^{-7}p^4x^2}$   
 $= \frac{m^9}{p^{10}x^2}$

# Algebra I – End of Course Review

## Adding and Multiplying Polynomials.:

Review Together:

$$12. \quad \underline{-3x^2 + 4x - 5} + \underline{4x^2 - 7x - 2}$$

$$x^2 - 3x - 7$$

$$13. \quad \underline{4xy^2 + 3x^3 - 2y - xy^2 + 5x^3}$$

$$3xy^2 + 8x^3 - 2y$$

$$14. \quad (-5x^2 - 6x - 5) + (4x^2 + 3x + 8)$$

$$-x^2 - 3x + 3$$

$$15. \quad (3x^2 + 4x - 2) - (5x^2 + 3x - 5)$$

$$\underline{3x^2 + 4x - 2} - \underline{5x^2 - 3x + 5}$$

$$-2x^2 + 7x - 7$$

Multiply:

$$16. \quad (x + 2)(x - 5)$$

$$\underline{x^2 - 5x + 2x - 10}$$

$$x^2 - 3x - 10$$

$$17. \quad (2x - 4)(3x + 5)$$

$$\underline{6x^2 + 10x - 12x - 20}$$

$$6x^2 - 2x - 20$$

$$18. \quad (x + 2)(3x^2 - 4x + 5)$$

$$\underline{3x^3 - 4x^2 + 5x}$$

$$+ \underline{6x^2 - 8x + 10}$$

$$3x^3 + 2x^2 - 3x + 10$$

$$19. \quad (x + 5)(x - 5)$$

$$\underline{x^2 - 5x + 5x - 25}$$

$$= x^2 - 25$$

$$20. \quad (x + 4)^2 = (x + 4)(x + 4)$$

$$= x^2 + 8x + 16$$

$$21. \quad (x - 5)^2 = (x - 5)(x - 5)$$

$$x^2 - 10x + 25$$

$$22. \quad (2x + 3)^2 = (2x + 3)(2x + 3)$$

$$= 4x^2 + 12x + 9$$

(Unit 8)

Homework:

$$23. \quad \underline{8x^2 - 7x - 2} + \underline{5x^2 + x - 4}$$

$$13x^2 - 6x - 6$$

$$25. \quad \underline{-3m^3p^2 - 4m^4 + 6m^3p^2 + 2m^4}$$

$$3m^3p^2 - 2m^4$$

$$27. \quad (9x^2 + 3x - 2) + (-x^2 - 2x + 6)$$

$$8x^2 + x + 4$$

$$29. \quad (-x^2 - 5x - 1) - (-3x^2 + x - 1)$$

$$\underline{-x^2 - 5x - 1} + \underline{3x^2 - x + 1}$$

$$2x^2 - 6x$$

$$31. \quad (x + 6)(x - 3)$$

$$\underline{x^2 - 3x + 6x - 18}$$

$$x^2 + 3x - 18$$

$$33. \quad (3x - 2)(4x - 3)$$

$$\underline{12x^2 - 9x - 8x + 6}$$

$$12x^2 - 17x + 6$$

$$35. \quad (x - 3)(2x^2 + 6x - 4)$$

$$\underline{2x^3 + 6x^2 - 4x}$$

$$- \underline{6x^2 - 18x + 12}$$

$$2x^3 - 22x + 12$$

$$37. \quad (x + 7)(x - 7)$$

$$= x^2 - 49$$

$$39. \quad (x + 2)^2 = (x + 2)(x + 2)$$

$$x^2 + 4x + 4$$

$$41. \quad (x - 3)^2 = (x - 3)(x - 3)$$

$$x^2 - 6x + 9$$

$$43. \quad (3x + 4)^2 = (3x + 4)(3x + 4)$$

$$= 9x^2 + 24x + 16$$

$$24. \quad \underline{-6x^2 + 9x + 3} - \underline{x^2 - 4x + 5}$$

$$-7x^2 + 13x - 2$$

$$26. \quad \underline{5x^3 - 9x^3p - 4x^2 - 3x^3p + 5x^3}$$

$$10x^3 - 12x^3p - 4x^2$$

$$28. \quad (-x^2 - 3x + 6) + (8x^2 + x - 9)$$

$$7x^2 - 2x - 3$$

$$30. \quad (-2x^2 + 5x) - (-4x^2 - 2x + 8)$$

$$\underline{-2x^2 + 5x} + \underline{4x^2 + 2x - 8}$$

$$2x^2 + 7x - 8$$

$$32. \quad (x - 4)(x + 3)$$

$$\underline{x^2 + 3x - 4x - 12}$$

$$x^2 - x - 12$$

$$34. \quad (5x + 2)(3x - 1)$$

$$\underline{15x^2 - 5x + 6x - 2}$$

$$15x^2 + x - 2$$

$$36. \quad (x + 5)(x^2 - 3x - 8)$$

$$\underline{x^3 - 3x^2 - 8x}$$

$$+ \underline{5x^2 - 15x - 40}$$

$$x^3 + 2x^2 - 23x - 40$$

$$38. \quad (x + 2)(x - 2)$$

$$= x^2 - 4$$

$$40. \quad (x + 9)^2 = (x + 9)(x + 9)$$

$$x^2 + 18x + 81$$

$$42. \quad (x - 6)^2 = (x - 6)(x - 6)$$

$$x^2 - 12x + 36$$

$$44. \quad (5x + 1)^2 = (5x + 1)(5x + 1)$$

$$= 25x^2 + 10x + 1$$



# Algebra I – End of Course Review

## Factoring Review:

Review Together:

1. Factor by GCF:  $\frac{3x}{3} - \frac{9}{3}$   
 $= 3(x-3)$

2. Factor by GCF:  
 $\frac{8x^2}{4} - \frac{12x}{4} + \frac{20}{4}$   
 $= 4(2x^2 - 3x + 5)$

3. Factor by GCF:  $\frac{6x^2}{x} - \frac{5x}{x}$   
 $= x(6x-5)$

4. Factor by GCF:  
 $\frac{15x^3}{5x} + \frac{10x^2}{5x} - \frac{35x}{5x}$   
 $= 5x(3x^2 + 2x - 7)$

5. Factor:  $x^2 - 2x - 24$   
 $\begin{array}{r} -24 \\ -6 \times 4 \\ -2 \end{array} (x-6)(x+4)$

6. Factor:  $x^2 - 25$   
 $\begin{array}{r} -25 \\ 5 \times -5 \\ 0 \end{array} (x+5)(x-5)$

7. Factor:  $9x^2 - 100$   
 $(3x+10)(3x-10)$

8. Factor:  $x^2 - 10x + 25$   
 $\begin{array}{r} 25 \\ -5 \times -5 \\ -10 \end{array} (x-5)^2$

9. Factor:  $4x^2 + 28x + 49$   
 $\begin{array}{r} 28 \\ 2 \times 7 \\ 2 \times 7 \end{array} = (2x+7)^2$

10. Factor:  $15x^2 - 2x - 8$   
 $\begin{array}{r} -120 \\ -12 \times 10 \\ -2 \end{array} (5x-4)(3x+2)$

11. Factor:  
 $\frac{2x^3}{2x^2} + \frac{10x^2}{2x^2} + \frac{3x}{3} + \frac{15}{3}$   
 $2x^2(x+5) \quad 3(x+5)$   
 $\rightarrow (2x^2+3)(x+5)$

## (Unit 8)

Homework:

1. Factor by GCF:  $\frac{5x}{5} + \frac{20}{5}$   
 $= 5(x+4)$

3. Factor by GCF:  
 $\frac{6x^2}{3} + \frac{3x}{3} + \frac{21}{3}$   
 $= 3(2x^2 + x + 7)$

5. Factor by GCF:  $\frac{3x^2}{x} + \frac{7x}{x}$   
 $= x(3x+7)$

7. Factor by GCF:  
 $\frac{14x^4}{7x^2} + \frac{21x^3}{7x^2} - \frac{35x^2}{7x^2}$   
 $= 7x^2(2x^2 + 3x - 5)$

9. Factor:  $x^2 + 8x + 15$   
 $\begin{array}{r} 15 \\ 3 \times 5 \\ 8 \end{array} (x+3)(x+5)$

11. Factor:  $x^2 - 16$   
 $\begin{array}{r} -16 \\ 4 \times -4 \\ 0 \end{array} (x+4)(x-4)$

13. Factor:  $25x^2 - 64$   
 $(5x+8)(5x-8)$

15. Factor:  $x^2 + 8x + 16$   
 $\begin{array}{r} 16 \\ 4 \times 4 \\ 8 \end{array} (x+4)^2$

17. Factor:  $9x^2 + 30x + 25$   
 $\begin{array}{r} 30 \\ 3 \times 5 \\ 3 \times 5 \end{array} = (3x+5)^2$

19. Factor:  $2x^2 + 7x - 15$   
 $\begin{array}{r} -30 \\ -10 \times 3 \\ -7 \end{array} (x+5)(2x-3)$

21. Factor:  
 $\frac{5x^3}{5x^2} - \frac{15x^2}{5x^2} + \frac{2x}{2} - \frac{6}{2}$   
 $5x^2(x-3) \quad 2(x-3)$   
 $\rightarrow (5x^2+2)(x-3)$

2. Factor by GCF:  $\frac{8x}{8} - \frac{72}{8}$   
 $= 8(x-9)$

4. Factor by GCF:  
 $\frac{15x^2}{5} - \frac{10x}{5} - \frac{20}{5}$   
 $= 5(3x^2 - 2x - 4)$

6. Factor by GCF:  $\frac{4x^2}{x} - \frac{3x}{x}$   
 $= x(4x-3)$

8. Factor by GCF:  
 $\frac{8x^3}{4x} + \frac{12x^2}{4x} - \frac{16x}{4x}$   
 $= 4x(2x^2 + 3x - 4)$

10. Factor:  $x^2 - 4x - 12$   
 $\begin{array}{r} -12 \\ -6 \times 2 \\ -4 \end{array} (x-6)(x+2)$

12. Factor:  $x^2 - 49$   
 $\begin{array}{r} -49 \\ 7 \times -7 \\ 0 \end{array} (x+7)(x-7)$

14. Factor:  $121x^2 - 1$   
 $(11x+1)(11x-1)$

16. Factor:  $x^2 - 12x + 36$   
 $\begin{array}{r} 36 \\ 6 \times 6 \\ -12 \end{array} (x-6)^2$

18. Factor:  $16x^2 - 88x + 121$   
 $\begin{array}{r} 88 \\ 4 \times 11 \\ 4 \times 11 \end{array} = (4x-11)^2$

20. Factor:  $3x^2 - 4x - 4$   
 $\begin{array}{r} -12 \\ -6 \times 2 \\ -4 \end{array} (x-2)(3x+2)$

22. Factor:  
 $\frac{8x^3}{4x^2} - \frac{12x^2}{4x^2} + \frac{6x}{3} - \frac{9}{3}$   
 $4x^2(2x-3) \quad 3(2x-3)$   
 $\rightarrow (4x^2+3)(2x-3)$

# Algebra I – End of Course Review

## Simplifying Radical Expressions:

Review Together:

1. Simplify:  $\sqrt{36} = \pm 6$

2. Simplify:  $\sqrt{40} = \pm 2\sqrt{10}$

**From here on – use only principal roots:**

3. Simplify:  $\sqrt{50x^3p^8}$   
 $= 5xp^4\sqrt{2x}$

4. Multiply:  $\sqrt{6} \cdot -\sqrt{7} = -\sqrt{42}$

5. Multiply:  $\sqrt{6} \cdot \sqrt{15} = \sqrt{90}$   
 $= 3\sqrt{10}$

6. Multiply:  $4\sqrt{3} \cdot 5\sqrt{15}$   
 $= 20\sqrt{45}$   
 $= 60\sqrt{5}$

7. Multiply:  $4\sqrt{6x^3} \cdot 2\sqrt{12x^4}$   
 $= 8\sqrt{72x^7}$   
 $= 48x^3\sqrt{2x}$

8. Simplify:  
 $\frac{\sqrt{20}}{\sqrt{4}} = \sqrt{5}$

9. Simplify:  
 $\sqrt{\frac{16x^3}{49x^2}} = \frac{4\sqrt{x}}{7}$

10. Rationalize:  
 $\frac{2}{\sqrt{6} \cdot \sqrt{6}} = \frac{2\sqrt{6}}{6} = \frac{\sqrt{6}}{3}$

11. Simplify:  $2\sqrt{5} + 6\sqrt{5}$   
 $= 8\sqrt{5}$

12. Simplify:  $6\sqrt{3} - 5\sqrt{12}$   
 $6\sqrt{3} - 10\sqrt{3}$   
 $= -4\sqrt{3}$

## (Unit 9)

Practice:

1. Simplify:  $\sqrt{81} = \pm 9$

3. Simplify:  $\sqrt{18} = \pm 3\sqrt{2}$

**From here on – use only principal roots:**

5. Simplify:  $\sqrt{27m^{10}x^9}$   
 $= 3m^5x^4\sqrt{3x}$

7. Multiply:  $\sqrt{3} \cdot \sqrt{5} = \sqrt{15}$

9. Multiply:  $-\sqrt{5} \cdot \sqrt{10} = -\sqrt{50}$   
 $= -5\sqrt{2}$

11. Multiply:  $-\sqrt{2} \cdot 3\sqrt{6}$   
 $= -3\sqrt{12}$   
 $= -6\sqrt{3}$

13. Multiply:  $2\sqrt{2x^5} \cdot 3\sqrt{14x^3}$   
 $= 6\sqrt{28x^8}$   
 $= 12x^4\sqrt{7}$

15. Simplify:  
 $\frac{\sqrt{15}}{\sqrt{5}} = \sqrt{3}$

17. Simplify:  
 $\sqrt{\frac{18x^5}{9x}} = x^2\sqrt{x}$

19. Rationalize:  
 $\frac{7}{\sqrt{2} \cdot \sqrt{2}} = \frac{7\sqrt{2}}{2}$

21. Simplify:  $5\sqrt{2} - \sqrt{2}$   
 $= 4\sqrt{2}$

23. Simplify:  $-7\sqrt{5} + 3\sqrt{20}$   
 $-7\sqrt{5} + 6\sqrt{5}$   
 $= -\sqrt{5}$

2. Simplify:  $\sqrt{121} = \pm 11$

4. Simplify:  $\sqrt{75} = \pm 5\sqrt{3}$

**From here on – use only principal roots:**

6. Simplify:  $\sqrt{200x^4p^7}$   
 $= 10x^2p^3\sqrt{2p}$

8. Multiply:  $-\sqrt{2} \cdot \sqrt{11} = -\sqrt{22}$

10. Multiply:  $\sqrt{10} \cdot \sqrt{2} = \sqrt{20}$   
 $= 2\sqrt{5}$

12. Multiply:  $2\sqrt{5} \cdot 5\sqrt{6}$   
 $= 10\sqrt{30}$

14. Multiply:  $-3\sqrt{5x^2} \cdot \sqrt{10x^5}$   
 $= -3\sqrt{50x^7}$   
 $= -15x^3\sqrt{2x}$

16. Simplify:  
 $\frac{\sqrt{24}}{\sqrt{6}} = \sqrt{4} = 2$

18. Simplify:  
 $\sqrt{\frac{200x^6p^4}{100x^4p^3}} = x\sqrt{2p}$

20. Rationalize:  
 $\frac{15}{\sqrt{3} \cdot \sqrt{3}} = \frac{15\sqrt{3}}{3} = 5\sqrt{3}$

22. Simplify:  $6\sqrt{7} + 3\sqrt{7}$   
 $= 9\sqrt{7}$

24. Simplify:  $7\sqrt{10} - \sqrt{90}$   
 $7\sqrt{10} - 3\sqrt{10}$   
 $= 4\sqrt{10}$

# Algebra I – End of Course Review

13. Solve:  $\sqrt{x+4} = -7$   

$$\begin{array}{r} -4 \quad -4 \\ \hline (\sqrt{x})^2 = (-11)^2 \\ x = 121 \end{array}$$

14. Solve:  $(\sqrt{x-2})^2 = (5)^2$   

$$\begin{array}{r} x-2 = 25 \\ +2 \quad +2 \\ \hline x = 27 \end{array}$$

15. Solve:  $(\sqrt{x+2})^2 = (4x-7)^2$   

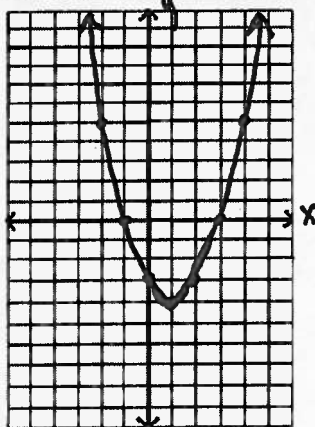
$$\begin{array}{r} x+2 \quad 4x-7 \\ -4x \quad \swarrow \quad \searrow \quad -2 \\ \hline -3x = -9 \\ x = 3 \end{array}$$

## Quadratic Functions

Review Together:

1. Make a table and graph for:  
 $y = x^2 - 2x - 3$   
 for the domain  $\{-2 \leq x \leq 4\}$

x	$x^2 - 2x - 3$	y
-2	$(-2)^2 - 2(-2) - 3$	5
-1	$(-1)^2 - 2(-1) - 3$	0
0	$(0)^2 - 2(0) - 3$	-3
1	$(1)^2 - 2(1) - 3$	-4
2	$(2)^2 - 2(2) - 3$	-3
3	$(3)^2 - 2(3) - 3$	0
4	$(4)^2 - 2(4) - 3$	5



2. Identify the vertex of the graph above.  $(1, -4)$
3. Identify the roots of the graph above.  
 $(-1, 0)$  and  $(3, 0)$

25. Solve:  $\sqrt{x+8} = -2$   

$$\begin{array}{r} -8 \quad -8 \\ \hline (\sqrt{x})^2 = (-10)^2 \\ x = 100 \end{array}$$

27. Solve:  $(\sqrt{x+4})^2 = (-3)^2$   

$$\begin{array}{r} x+4 = 9 \\ -4 \quad -4 \\ \hline x = 5 \end{array}$$

29. Solve:  $(\sqrt{7x-4})^2 = (\sqrt{5x+10})^2$   

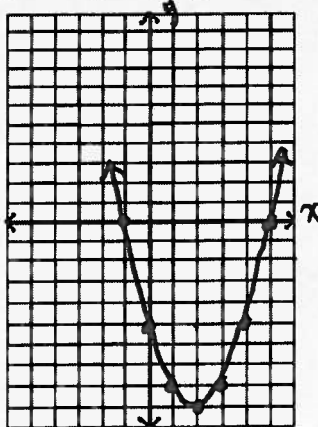
$$\begin{array}{r} 7x-4 \quad 5x+10 \\ -5x \quad \swarrow \quad \searrow \quad +4 \\ \hline 2x = 14 \\ x = 7 \end{array}$$

## (Unit 10)

Practice:

1. Make a table and graph for:  
 $y = x^2 - 4x - 5$   
 for the domain  $\{-1 \leq x \leq 5\}$

x	$x^2 - 4x - 5$	y
-1	$(-1)^2 - 4(-1) - 5$	0
0	$(0)^2 - 4(0) - 5$	-5
1	$(1)^2 - 4(1) - 5$	-8
2	$(2)^2 - 4(2) - 5$	-9
3	$(3)^2 - 4(3) - 5$	-8
4	$(4)^2 - 4(4) - 5$	-5
5	$(5)^2 - 4(5) - 5$	0



3. Identify the vertex of the graph above.  $(2, -9)$
5. Identify the roots of the graph above.  
 $(-1, 0)$  and  $(5, 0)$

26. Solve:  $\sqrt{x-5} = 12$   

$$\begin{array}{r} +5 \quad +5 \\ \hline (\sqrt{x})^2 = (17)^2 \\ x = 289 \end{array}$$

28. Solve:  $(\sqrt{x-6})^2 = (-15)^2$   

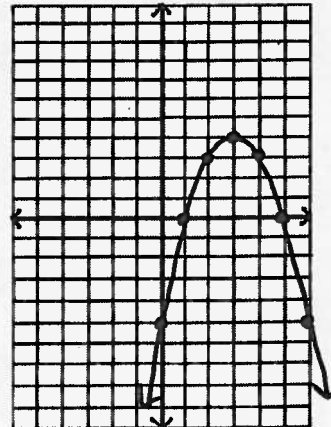
$$\begin{array}{r} x-6 = 225 \\ +6 \quad +6 \\ \hline x = 231 \end{array}$$

30. Solve:  $(\sqrt{x+5})^2 = (\sqrt{5x-11})^2$   

$$\begin{array}{r} x+5 \quad 5x-11 \\ -5x \quad \swarrow \quad \searrow \quad -5 \\ \hline -4x = -16 \\ x = 4 \end{array}$$

2. Make a table and graph for:  
 $y = -x^2 + 6x - 5$   
 for the domain  $\{0 \leq x \leq 6\}$

x	$-x^2 + 6x - 5$	y
0	$-(0)^2 + 6(0) - 5$	-5
1	$-(1)^2 + 6(1) - 5$	0
2	$-(2)^2 + 6(2) - 5$	3
3	$-(3)^2 + 6(3) - 5$	4
4	$-(4)^2 + 6(4) - 5$	3
5	$-(5)^2 + 6(5) - 5$	0
6	$-(6)^2 + 6(6) - 5$	-5

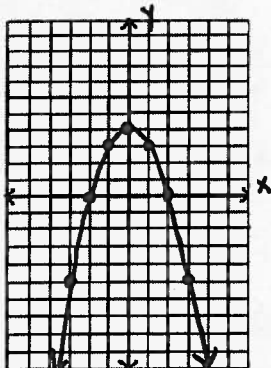


4. Identify the vertex of the graph above.  $(3, 4)$
6. Identify the roots of the graph above.  
 $(1, 0)$  and  $(5, 0)$

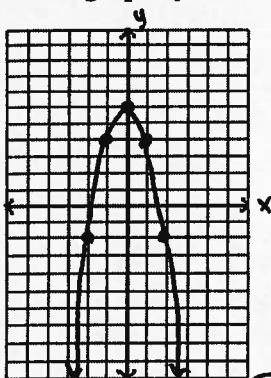


# Algebra I – End of Course Review

4. Use the parent graph pattern to graph:  $y = -x^2 + 4$



5. Double the parent graph pattern to graph:  $y = -2x^2 + 6$

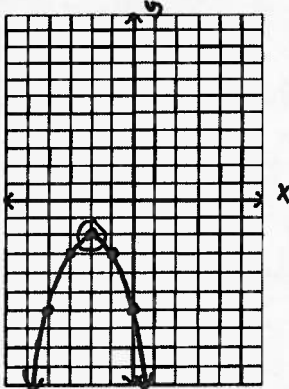


6. Find the vertex of:

$$y = -x^2 - 4x - 6$$

$x = \frac{-b}{2a} = \frac{-(-4)}{2(-1)} = \frac{4}{-2} = -2$ 
 $y = -(-2)^2 - 4(-2) - 6 = -4 + 8 - 6 = -2$ 
 Vertex:  $(-2, -2)$

7. Now make a graph for the quadratic from # 6

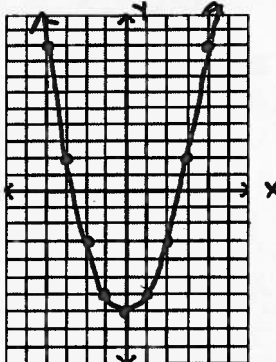


Is the vertex a maximum or minimum value? maximum

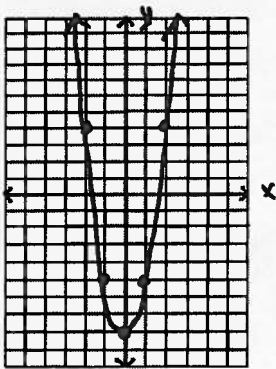
Give the domain: all real #'s

Give the range:  $y \leq -2$

7. Use the parent graph pattern to graph:  $y = x^2 - 7$



9. Triple the parent graph pattern to graph:  $y = 3x^2 - 8$

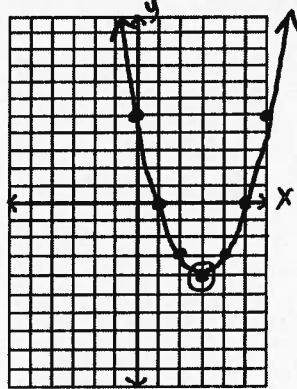


11. Find the vertex of:

$$y = x^2 - 6x + 5$$

$x = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = \frac{6}{2} = 3$ 
 $y = (3)^2 - 6(3) + 5 = 9 - 18 + 5 = -4$ 
 Vertex:  $(3, -4)$

13. Now make a graph for the quadratic from # 11

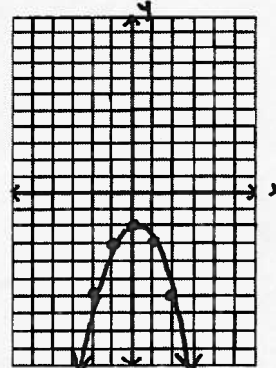


Is the vertex a maximum or minimum value? minimum

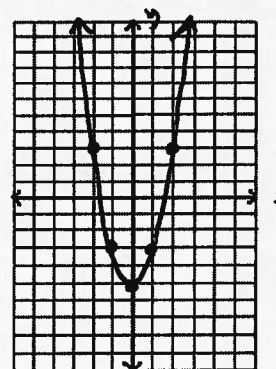
Give the domain: all real #'s

Give the range:  $y \geq -4$

8. Use the parent graph pattern to graph:  $y = -x^2 - 2$



10. Double the parent graph pattern to graph:  $y = 2x^2 - 5$

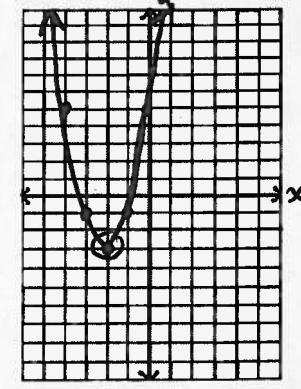


12. Find the vertex of:

$$y = 2x^2 + 8x + 5$$

$x = \frac{-b}{2a} = \frac{-8}{2(2)} = \frac{-8}{4} = -2$ 
 $y = 2(-2)^2 + 8(-2) + 5 = 2 \cdot 4 - 16 + 5 = 8 - 16 + 5 = -3$ 
 Vertex:  $(-2, -3)$

14. Now make a graph for the quadratic from # 12



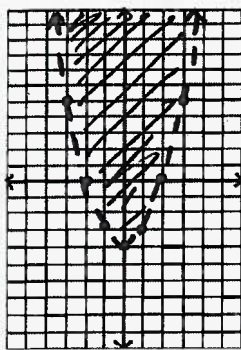
Is the vertex a maximum or minimum value? minimum

Give the domain: all real #'s

Give the range:  $y \geq -3$

# Algebra I – End of Course Review

8. Graph the quadratic inequality:  $y > x^2 - 4$



Solving for Roots:

$$1. 3x^2 - 5 = 13$$

$$\begin{array}{r} 3x^2 - 5 = 13 \\ +5 \quad +5 \\ \hline 3x^2 = 18 \end{array}$$

$$x^2 = 6$$

$$x = \pm \sqrt{6}$$

$$2. 3x^2 - 6 = 54$$

$$\begin{array}{r} 3x^2 - 6 = 54 \\ +6 \quad +6 \\ \hline 3x^2 = 60 \end{array}$$

$$x^2 = 20$$

$$x = \pm 2\sqrt{5}$$

$$3. x^2 - 8x - 48 = 0$$

$$\begin{array}{r} -48 \\ -12 \times 4 \\ \hline (x-12)(x+4) = 0 \end{array}$$

$$x = 12 \text{ or } 4$$

$$4. 8x^2 - 3x = 0$$

$$\begin{array}{r} 8x^2 - 3x = 0 \\ \hline x(8x-3) = 0 \end{array}$$

$$x = 0 \text{ or } \frac{3}{8}$$

$$5. 2x^2 + 5x - 3 = 0$$

$$\begin{array}{r} -6 \\ 6 \times -1 \\ \hline (x+3)(2x-1) = 0 \end{array}$$

$$x = -3 \text{ or } \frac{1}{2}$$

$$6. x^2 - 8x + 5 = 0$$

$$\begin{array}{r} +16 \\ +11 \quad +11 \\ \hline (x^2 - 8x + 16) = 11 \end{array}$$

$$\sqrt{(x-4)^2} = \sqrt{11}$$

$$x - 4 = \pm \sqrt{11}$$

$$x = 4 \pm \sqrt{11}$$

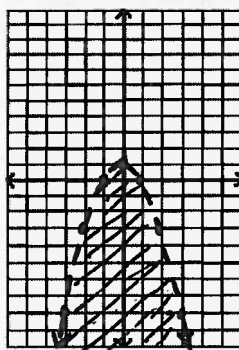
$$7. 2x^2 + 6x - 3 = 0$$

$$a=2 \quad x = \frac{-6 \pm \sqrt{6^2 - 4(2)(-3)}}{2(2)}$$

$$b=6 \quad x = \frac{-6 \pm \sqrt{36 + 24}}{4}$$

$$c=-3 \quad x = \frac{-6 \pm \sqrt{60}}{4} = \frac{-6 \pm 2\sqrt{15}}{4} = \frac{-3 \pm \sqrt{15}}{2}$$

15. Graph the quadratic inequality:  $y < -x^2 + 1$



Solving for Roots:

$$1. 2x^2 + 8 = 58$$

$$\begin{array}{r} 2x^2 + 8 = 58 \\ -8 \quad -8 \\ \hline 2x^2 = 50 \end{array}$$

$$x^2 = 25$$

$$x = \pm 5$$

$$3. 2x^2 + 9 = 33$$

$$\begin{array}{r} 2x^2 + 9 = 33 \\ -9 \quad -9 \\ \hline 2x^2 = 24 \end{array}$$

$$x^2 = 12$$

$$x = \pm 2\sqrt{3}$$

$$5. x^2 + 14x + 45 = 0$$

$$\begin{array}{r} 45 \\ 9 \times 5 \\ \hline (x+9)(x+5) = 0 \end{array}$$

$$x = -9 \text{ or } -5$$

$$7. \frac{x^2}{x} + \frac{5x}{x} = 0$$

$$x(x+5) = 0$$

$$x = 0 \text{ or } -5$$

$$9. 5x^2 + 22x + 8 = 0$$

$$\begin{array}{r} 40 \\ 20 \times 2 \\ \hline (x+4)(5x+2) = 0 \end{array}$$

$$x = -4 \text{ or } -\frac{2}{5}$$

$$11. x^2 + 14x + 8 = 0$$

$$\begin{array}{r} +49 \\ +41 \quad +41 \\ \hline (x^2 + 14x + 49) = 41 \end{array}$$

$$\sqrt{(x+7)^2} = \sqrt{41}$$

$$x + 7 = \pm \sqrt{41}$$

$$x = -7 \pm \sqrt{41}$$

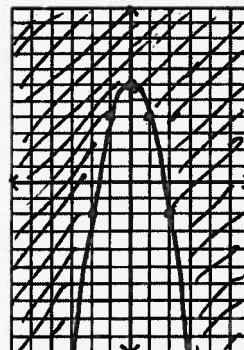
$$13. x^2 - 3x - 6 = 0$$

$$a=1 \quad x = \frac{3 \pm \sqrt{(-3)^2 - 4(1)(-6)}}{2(1)}$$

$$b=-3 \quad x = \frac{3 \pm \sqrt{9 + 24}}{2}$$

$$c=-6 \quad x = \frac{3 \pm \sqrt{33}}{2}$$

16. Graph the quadratic inequality:  $y \geq -2x^2 + 6$



Solving for Roots:

$$2. 4x^2 - 10x + 7 = -17$$

$$\begin{array}{r} 4x^2 - 10x + 7 = -17 \\ -7 \quad -7 \\ \hline 4x^2 - 10x = -24 \end{array}$$

$$x^2 = 4$$

$$x = \pm 2$$

$$4. 4x^2 - 2x^2 - 3 = 45$$

$$\begin{array}{r} 2x^2 - 3 = 45 \\ +3 \quad +3 \\ \hline 2x^2 = 48 \end{array}$$

$$x^2 = 24$$

$$x = \pm 2\sqrt{6}$$

$$6. x^2 - 10x + 21 = 0$$

$$\begin{array}{r} 21 \\ -7 \times -3 \\ \hline (x-7)(x-3) = 0 \end{array}$$

$$x = 7 \text{ or } 3$$

$$8. \frac{7x^2}{x} - \frac{4x}{x} = 0$$

$$x(7x-4) = 0$$

$$x = 0 \text{ or } \frac{4}{7}$$

$$10. 4x^2 + 11x - 7 = 0$$

$$\begin{array}{r} 28 \\ 7 \times 4 \\ \hline 4x^2 + 11x + 7 = 0 \end{array}$$

$$(4x+7)(x+1) = 0$$

$$x = -\frac{7}{4} \text{ or } -1$$

$$12. x^2 - 10x - 15 = 0$$

$$\begin{array}{r} +25 \\ +40 \quad +40 \\ \hline (x^2 - 10x + 25) = 40 \end{array}$$

$$\sqrt{(x-5)^2} = \sqrt{40}$$

$$x - 5 = \pm 2\sqrt{10}$$

$$x = 5 \pm 2\sqrt{10}$$

$$14. 2x^2 - 6x + 3 = 0$$

$$a=2 \quad x = \frac{6 \pm \sqrt{(-6)^2 - 4(2)(3)}}{2(2)}$$

$$b=-6 \quad x = \frac{6 \pm \sqrt{36 - 24}}{4}$$

$$c=3 \quad x = \frac{6 \pm \sqrt{12}}{4} = \frac{6 \pm 2\sqrt{3}}{4} = \frac{3 \pm \sqrt{3}}{2}$$

$$b^2 - 4ac$$

# Algebra I – End of Course Review

8. How many solutions are there for the quadratic:

$$y = 2x^2 - 7x + 3$$

$$\sqrt{49 - 4(2)(3)}$$

$$\sqrt{49 - 24}$$

$$\sqrt{25}$$

2 roots

## Review of Rational Expressions

Review Together:

Simplify:

$$1. \frac{6x+12}{x+2} = \frac{6(x+2)}{(x+2)} = \boxed{6}$$

$$2. \frac{12m^2}{3m+6} = \frac{\cancel{12}m^2}{\cancel{3}(m+2)} = \boxed{\frac{4m^2}{m+2}}$$

$$3. \frac{(x+3)(x-5)}{x^2-9} = \boxed{\frac{x+3}{x-1}}$$

$$4. \frac{8-m}{m^2-64} = \frac{-1(\cancel{m-8})}{(m+8)(\cancel{m-8})} = \boxed{\frac{-1}{m+8}}$$

Multiply:

$$5. \frac{4m^2}{3m} \cdot \frac{2m}{9m} = \boxed{\frac{4}{9m}}$$

$$6. \frac{x+2}{8x} \cdot \frac{8(x+2)}{x^2-4} = \boxed{\frac{x+2}{x(x-2)}}$$

$$7. \frac{3x+2}{2x+4} \cdot \frac{(x+2)(x+3)}{(x^2+5x+6)} = \boxed{\frac{(3x+2)(x+3)}{2}}$$

9. How many roots are there for the quadratic:

$$y = x^2 + 4x + 4$$

$$\sqrt{16 - 4(1)(4)}$$

$$\sqrt{16 - 16}$$

$$\sqrt{0}$$

1 root

(Unit 11)

Practice:

Simplify:

$$1. \frac{4m-2}{2m-1} = \frac{2(2m-1)}{(2m-1)} = \boxed{2}$$

$$3. \frac{7p^3}{14p+28} = \frac{\cancel{7}p^3}{\cancel{14}(p+2)} = \boxed{\frac{p^3}{2(p+2)}}$$

$$5. \frac{(x+5)(x-5)}{x^2-25} = \boxed{\frac{x-5}{x-4}}$$

$$7. \frac{5-x}{x^2-8x+15} = \frac{-1(\cancel{x-5})}{(\cancel{x-5})(x-3)} = \boxed{\frac{-1}{x-3}}$$

Multiply:

$$9. \frac{1}{3} \cdot \frac{x^2}{3} = \boxed{\frac{x^2}{3}}$$

$$11. \frac{(x+3)(x-3)}{2x} \cdot \frac{3x-24}{x^2-5x-24} = \boxed{\frac{x-3}{2}}$$

$$13. \frac{2v}{v+3} \cdot \frac{(v-5)(v+5)}{(v^2-2v-15)} = \boxed{2v(v-5)}$$

10. How many times does the graph of this quadratic cross the x-axis:

$$y = x^2 + 3x + 5$$

$$\sqrt{9 - 4(1)(5)}$$

$$\sqrt{9 - 20}$$

$$\sqrt{-11}$$

No roots

Simplify:

$$2. \frac{t+5}{4t+20} = \frac{\cancel{t+5}}{4(\cancel{t+5})} = \boxed{\frac{1}{4}}$$

$$4. \frac{10x^2}{2x^2-14x} = \frac{\cancel{10}x^2}{\cancel{2}x(x-7)} = \boxed{\frac{5x}{x-7}}$$

$$6. \frac{(x-5)(x+2)}{x^2-3x-10} = \boxed{\frac{x-5}{x-2}}$$

$$8. \frac{3-p}{4p-12} = \frac{-1(\cancel{p-3})}{4(\cancel{p-3})} = \boxed{\frac{-1}{4}}$$

Multiply:

$$10. \frac{10w^2}{8w} \cdot \frac{12w^5}{8w} = \boxed{4w^5}$$

$$12. \frac{(x+5)(x-4)}{x^2+x-20} \cdot \frac{3x+9}{3x^2+15x} = \boxed{\frac{x+3}{x(x+4)}}$$

$$14. \frac{4(m+4)}{m^2-1} \cdot \frac{(m-1)}{(m+1)(m-1)} = \boxed{4}$$

# Algebra I – End of Course Review

Divide:

$$8. \frac{5m+10}{28m-40} \div \frac{7m+14}{14m-20}$$

$$\frac{5(\cancel{m+2})}{\cancel{4}(2m-10)} \cdot \frac{2(\cancel{2m-10})}{7(\cancel{m+2})} = \boxed{\frac{5}{14}}$$

$$9. \frac{y+2}{y+3} \cdot \frac{1}{(y+2)} = \boxed{\frac{1}{y+3}}$$

Add:

$$10. \frac{2x}{3x+15} + \frac{10}{3x+15}$$

$$\frac{2x+10}{3x+15} = \frac{2(\cancel{x+5})}{3(\cancel{x+5})} = \boxed{\frac{2}{3}}$$

$$11. \frac{6x}{x-2} - \frac{12}{x-2}$$

$$\frac{6x-12}{x-2} = \frac{6(\cancel{x-2})}{(\cancel{x-2})} = \boxed{6}$$

$$12. \frac{2x}{2x-10} - \frac{(x+5)}{2x-10}$$

$$\frac{x-5}{2x-10} = \frac{\cancel{x-5}}{2(\cancel{x-5})} = \boxed{\frac{1}{2}}$$

$$13. \frac{x \cdot 1}{x \cdot 4} - \frac{3 \cdot 2}{2x \cdot 2} =$$

$$\frac{x}{4x} - \frac{6}{4x} = \boxed{\frac{x-6}{4x}}$$

$$14. \frac{(p-3)5}{(p-3)p+2} + \frac{6(p+2)}{p-3(p+2)}$$

$$\frac{5p-15+6p+12}{(p-3)(p+2)} = \boxed{\frac{11p-3}{(p-3)(p+2)}}$$

Subtract:

$$15. \frac{x-2}{x^2+5x+6} - \frac{3(x+2)}{(x+3)(x+2)}$$

$$\frac{x-2-3x-6}{(x+2)(x+3)} = \frac{-2x-8}{(x+2)(x+3)} = \boxed{\frac{-2(x+4)}{(x+2)(x+3)}}$$

Divide:

$$15. \frac{3x+12}{4x} \div \frac{x+4}{2x^2}$$

$$\frac{3(\cancel{x+4})}{2\cancel{4}x} \cdot \frac{2x^2x}{(\cancel{x+4})} = \boxed{\frac{3x}{2}}$$

$$17. \frac{x-3}{y-2} \cdot \frac{1}{(x^2+2x-15)(x+5)}$$

$$= \boxed{\frac{1}{(y-2)(x+5)}}$$

Add:

$$19. \frac{x}{x^2+4x+3} + \frac{1}{x^2+4x+3}$$

$$\frac{x+1}{x^2+4x+3} = \frac{x+1}{(x+3)(x+1)} = \boxed{\frac{1}{x+3}}$$

$$21. \frac{2x}{x^2-x-20} - \frac{10}{x^2-x-20}$$

$$\frac{2x-10}{x^2-x-20} = \frac{2(\cancel{x-5})}{(\cancel{x-5})(x+4)} = \boxed{\frac{2}{x+4}}$$

$$23. \frac{x^2}{8x-24} - \frac{(7x-12)}{8x-24}$$

$$\frac{x^2-7x+12}{8x-24} = \frac{(x-3)(x-4)}{8(\cancel{x-3})} = \boxed{\frac{x-4}{8}}$$

$$25. \frac{3x \cdot x}{3x \cdot 5} - \frac{2 \cdot 5}{3x \cdot 5}$$

$$\frac{3x^2}{15x} - \frac{10}{15x} = \boxed{\frac{3x^2-10}{15x}}$$

$$27. \frac{(m+5)3}{(m+5)m+1} + \frac{2(m+1)}{m+5(m+1)}$$

$$\frac{3m+15+2m+2}{(m+5)(m+1)} = \boxed{\frac{5m+17}{(m+5)(m+1)}}$$

Subtract:

$$29. \frac{2x}{3x+3} - \frac{2 \cdot 3}{3(x+1) \cdot 3}$$

$$\frac{2x-6}{3(x+1)} = \boxed{\frac{2(x-3)}{3(x+1)}}$$

Divide:

$$16. \frac{x^2-9}{7x-21} \div \frac{5x+15}{14x-21}$$

$$\frac{(x+3)(x-3)}{7(\cancel{x-3})} \cdot \frac{7(2x-3)}{5(\cancel{x+3})} = \boxed{\frac{2x-3}{5}}$$

$$18. \frac{x^2-4}{x-2} \div \frac{(x^2+7x+10)}{(x+2)(x+5)}$$

$$= \boxed{\frac{1}{x+5}}$$

Add:

$$20. \frac{x^2}{4x+12} + \frac{9x+18}{4x+12}$$

$$\frac{x^2+9x+18}{4x+12} = \frac{(x+3)(x+6)}{4(\cancel{x+3})} = \boxed{\frac{x+6}{4}}$$

$$22. \frac{x^2}{x-5} - \frac{25}{x-5}$$

$$\frac{x^2-25}{x-5} = \frac{(x+5)(\cancel{x-5})}{(\cancel{x-5})} = \boxed{x+5}$$

$$24. \frac{2x^2+5}{x^2-5x-14} - \frac{(x^2+9)}{x^2-5x-14}$$

$$\frac{x^2-4}{x^2-5x-14} = \frac{(x+2)(x-2)}{(x-7)(x+2)} = \boxed{\frac{x-2}{x-7}}$$

$$26. \frac{x^2}{6x} - \frac{3 \cdot 3}{2x \cdot 3}$$

$$\frac{x^2}{6x} - \frac{9}{6x} = \frac{x^2-9}{6x} = \boxed{\frac{(x+3)(x-3)}{6x}}$$

$$28. \frac{(x-2)5}{(x-2)x-4} + \frac{3(x-4)}{x-2(x-4)}$$

$$\frac{5x-10+3x-12}{(x-2)(x-4)} = \boxed{\frac{8x-22}{(x-2)(x-4)}}$$

Subtract:

$$30. \frac{(x+3)x}{(x+3)5} - \frac{(x+7)5}{(x+3)5}$$

$$\frac{x^2+3x-5x-35}{5(x+3)} = \frac{x^2-2x-35}{5(x+3)} = \boxed{\frac{(x-7)(x+5)}{5(x+3)}}$$

# Algebra I – End of Course Review

## Word Problems Review:

Review Together:

1. Five less than twice a number is 9. Find the number.

$$2x - 5 = 9$$

$$2x = 14$$

$$x = 7$$

2. Four times the sum of a number and two is 28. Find the number.

\*I finally intro ÷ by 4 instead of distributing

$$4(x+2) = 28$$

$$(x+2) = 7$$

$$x = 5$$

3. Five more than a number is the same as twice the number decreased by two. Find the number.

$$x + 5 = 2x - 2$$

$$-2x \quad \rightarrow \quad -5$$

$$-x = -7$$

$$x = 7$$

4. Three consecutive numbers have a sum of 18. What are the numbers?

Let 1st # =  $x \rightarrow 5$   
 Let 2nd # =  $x+1 \rightarrow 6$   
 Let 3rd # =  $x+2 \rightarrow 7$

$$3x + 3 = 18$$

$$3x = 15$$

$$x = 5$$

5. Three consecutive odd numbers have a sum of 27. What are the numbers?

Let 1st # =  $x \rightarrow 7$   
 Let 2nd # =  $x+2 \rightarrow 9$   
 Let 3rd # =  $x+4 \rightarrow 11$

$$3x + 6 = 27$$

$$3x = 21$$

$$x = 7$$

6. A larger number is three less than four times a smaller number. If their sum is 32, find the numbers.

Let smaller # =  $x \rightarrow 7$   
 Let larger # =  $4x - 3 \rightarrow 25$

$$5x - 3 = 32$$

$$5x = 35$$

$$x = 7$$

(All Chapters) Practice:

1. Seven more than three times a number is 19. Find the number.

$$3x + 7 = 19$$

$$3x = 12$$

$$x = 4$$

3. Twice the sum of a number and six is 18. Find the number.

$$2(x+6) = 18$$

$$x+6 = 9$$

$$x = 3$$

5. Six less than twice a number is the same as the number increased by seven. Find the number.

$$2x - 6 = x + 7$$

$$-x \quad \rightarrow \quad -6$$

$$x = 13$$

7. Three consecutive numbers have a sum of 159. What are the numbers?

Let 1st # =  $x \rightarrow 52$   
 Let 2nd # =  $x+1 \rightarrow 53$   
 Let 3rd # =  $x+2 \rightarrow 54$

$$3x + 3 = 159$$

$$3x = 156$$

$$x = 52$$

9. Four consecutive odd numbers have a sum of 51. What are the numbers?

Let 1st =  $x \rightarrow 15$   
 Let 2nd =  $x+2 \rightarrow 17$   
 Let 3rd =  $x+4 \rightarrow 19$

$$3x + 6 = 51$$

$$3x = 45$$

$$x = 15$$

11. A greater number is seven less than five times a smaller number. If their sum is 41, find the numbers.

Let smaller # =  $x \rightarrow 8$   
 Let greater # =  $5x - 7 \rightarrow 33$

$$6x - 7 = 41$$

$$6x = 48$$

$$x = 8$$

2. Four less than half a number is 7. Find the number.

$$\frac{1}{2}x - 4 = 7$$

$$(2) \frac{1}{2}x = 11$$

$$x = 22$$

4. Three times the difference of a number and four is -9. Find the number.

$$3(x-4) = -9$$

$$(x-4) = -3$$

$$x = 1$$

6. Two more than three times a number is the same eight less than twice the number. Find the number.

$$3x + 2 = 2x - 8$$

$$-2x \quad \rightarrow \quad -2$$

$$x = -10$$

8. Three consecutive numbers have a sum of -27. What are the numbers?

Let 1st # =  $x \rightarrow -10$   
 Let 2nd # =  $x+1 \rightarrow -9$   
 Let 3rd # =  $x+2 \rightarrow -8$

$$3x + 3 = -27$$

$$3x = -30$$

$$x = -10$$

10. Three consecutive even numbers have a sum of -60. What are the numbers?

Let 1st # =  $x \rightarrow -22$   
 Let 2nd # =  $x+2 \rightarrow -20$   
 Let 3rd # =  $x+4 \rightarrow -18$

$$3x + 6 = -60$$

$$3x = -66$$

$$x = -22$$

12. A larger number is five more than twice a smaller number. If their sum is 23, find the numbers.

Let smaller # =  $x \rightarrow 6$   
 Let larger # =  $2x + 5 \rightarrow 17$

$$3x + 5 = 23$$

$$3x = 18$$

$$x = 6$$



# Algebra I – End of Course Review

7. The length of a rectangle is two centimeters more than three times the width. If the perimeter is 36cm, find the width and length.

$$\begin{array}{l} \text{width} = x \\ \text{length} = 3x + 2 \\ \text{Perimeter} = 36 \\ 2x + 2(3x + 2) = 36 \\ 2x + 6x + 4 = 36 \\ 8x + 4 = 36 \\ 8x = 32 \\ x = 4 \end{array}$$

Let width =  $x \rightarrow 4$   
Let length =  $3x + 2 \rightarrow 14$

8. Three more than six times a number is at least 21. Find the smallest possible answer that makes this true.

$$\begin{array}{r} 6x + 3 \geq 21 \\ -3 \quad -3 \\ \hline 6x \geq 18 \\ \div 6 \quad \div 6 \\ \hline x \geq 3 \end{array}$$

9. Nine less than twice a number is at most 19. Find the largest possible answer that makes this true.

$$\begin{array}{r} 2x - 9 \leq 19 \\ +9 \quad +9 \\ \hline 2x \leq 28 \\ \div 2 \quad \div 2 \\ \hline x \leq 14 \end{array}$$

10. Amanda opens a bank account with 23 dollars and saves \$5 dollars a week. Her brother gets 100 dollars for his birthday, but spends 6 dollars a week. How many weeks until they have the same amount of money and how much will that be?

Let  $x$  = weeks  
Let  $y$  = savings

Amanda:  $y = 5x + 23$   
Brother:  $y = -6x + 100$

$$\begin{array}{r} 5x + 23 = -6x + 100 \\ +6x \quad +6x \quad -23 \quad -23 \\ \hline 11x = 77 \\ x = 7 \end{array}$$

In 7 weeks, they will both have 58 dollars.

13. The length of a rectangle is five centimeters less than four times the width. If the perimeter is 50cm, find the width and length.

$$\begin{array}{l} \text{width} = x \\ \text{length} = 4x - 5 \\ \text{Perimeter} = 50 \\ 2x + 2(4x - 5) = 50 \\ 2x + 8x - 10 = 50 \\ 10x - 10 = 50 \\ 10x = 60 \\ x = 6 \end{array}$$

Let width =  $x \rightarrow 6$   
Let length =  $4x - 5 \rightarrow 19$

15. Six less than five times a number is at least 29. Find the largest possible answer that makes this true.

$$\begin{array}{r} 5x - 6 \geq 29 \\ +6 \quad +6 \\ \hline 5x \geq 35 \\ \div 5 \quad \div 5 \\ \hline x \geq 7 \end{array}$$

17. Four more than twice a number is at most 14. Find the largest possible answer that makes this true.

$$\begin{array}{r} 2x + 4 \leq 14 \\ -4 \quad -4 \\ \hline 2x \leq 10 \\ \div 2 \quad \div 2 \\ \hline x \leq 5 \end{array}$$

19. One wrestler weighed 106 pounds at the start of the season and had to gain 2 pounds a week. Another wrestler weighed 160 pounds and had lose 4 pounds a week. How many weeks until the wrestlers weigh the same and what will that weight be?

Let  $x$  = weeks  
Let  $y$  = weight

Wrestler #1:  $y = 2x + 106$   
Wrestler #2:  $y = -4x + 160$

$$\begin{array}{r} 2x + 106 = -4x + 160 \\ +4x \quad +4x \quad -106 \quad -106 \\ \hline 6x = 54 \\ x = 9 \end{array}$$

In 9 weeks they will both weigh 124 lbs.

14. The length of a rectangle is six centimeters more than the width. If the perimeter is 60cm, find the width and length.

$$\begin{array}{l} \text{width} = x \\ \text{length} = x + 6 \\ \text{Perimeter} = 60 \\ 2x + 2(x + 6) = 60 \\ 2x + 2x + 12 = 60 \\ 4x + 12 = 60 \\ 4x = 48 \\ x = 12 \end{array}$$

Let width =  $x \rightarrow 12$   
Let length =  $x + 6 \rightarrow 18$

16. One more than twice a number is at least -15. Find the smallest possible answer that makes this true.

$$\begin{array}{r} 2x + 1 \geq -15 \\ -1 \quad -1 \\ \hline 2x \geq -16 \\ \div 2 \quad \div 2 \\ \hline x \geq -8 \end{array}$$

18. Seven less than half a number is at most 3. Find the largest possible answer that makes this true.

$$\begin{array}{r} \frac{1}{2}x - 7 \leq 3 \\ +7 \quad +7 \\ \hline \frac{1}{2}x \leq 10 \\ (2) \quad (2) \\ \hline x \leq 20 \end{array}$$

20. A plane flying at an altitude of 4200 feet starts to descend at a rate of 250 feet per second. A second plane starts at an altitude of 2700 feet and starts to ascend at a rate of 125 feet per second. How many seconds until the planes are flying at the same altitude and what altitude will that be?

Let  $x$  = seconds  
Let  $y$  = altitude

Plane #1:  $y = -250x + 4200$   
Plane #2:  $y = 125x + 2700$

$$\begin{array}{r} -250x + 4200 = 125x + 2700 \\ -125x \quad -125x \quad -4200 \quad -4200 \\ \hline -375x = -1500 \\ x = 4 \end{array}$$

In 4 seconds both planes will be at 3200 feet.

# Algebra I – End of Course Review

11. Adult tickets to a play are \$12, student tickets are only \$8. If a theater sells 90 tickets to a play for a total of \$980, how many of each kind of ticket did the theater sell?

Let  $a$  = adult tickets  
Let  $s$  = student tickets

$$\begin{aligned} 8(a+s=90) &\rightarrow -8a-8s=-720 \\ 12a+8s=980 &\rightarrow 12a+8s=980 \\ \hline 4a &= 260 \end{aligned}$$

65 adult  
25 student  $\leftarrow a=65$

12. Jessica had 15 coins in her piggy bank, all dimes and quarters. If they totaled \$3.60, how many were dimes and how many were quarters?

$$\begin{aligned} 10(d+q=15) &\rightarrow -10d-10q=-150 \\ 25d+25q=360 &\rightarrow 10d+25q=360 \\ \hline 15q &= 210 \end{aligned}$$

14 quarters  
1 dime  $\leftarrow q=14$

\*For the next two problems use:  
 $h = -16t^2 + vt + c$

13. If a ball is kicked up at a velocity of 32 miles per second from a height of 4 feet, how many seconds until the ball reaches maximum height and what will that height be?

$$\begin{aligned} h &= -16t^2 + 32t + 4 \\ t &= \frac{-32}{2(-16)} = \frac{-32}{-32} = 1 \end{aligned}$$

$$\begin{aligned} h &= -16(1)^2 + 32(1) + 4 \\ &= -16 + 32 + 4 \\ &= 16 + 4 \\ &= 20 \end{aligned}$$

In 1 second the ball will be at 20 ft.

21. Lisa is selling candles and soap for a fundraiser. She sells a total of 24 items for a total of \$112. If the candles sold for \$4 each and the soap sold for \$5 each, how many of each did she sell?

Let  $c$  = candles  
Let  $s$  = soap

$$\begin{aligned} 4(c+s=24) &\rightarrow -4c-4s=-96 \\ 4c+5s=112 &\rightarrow 4c+5s=112 \\ \hline s &= 16 \end{aligned}$$

16 soaps  
8 candles  $\leftarrow s=16$

23. Dylan looked in the couch for loose change. He found 22 nickels and quarters totaling \$4.30. How many were nickels and how many were quarters?

$$\begin{aligned} 5(n+q=22) &\rightarrow -5n-5q=-110 \\ 5n+25q=430 &\rightarrow 5n+25q=430 \\ \hline 20q &= 320 \end{aligned}$$

16 quarters  
6 nickels  $\leftarrow q=16$

\*For the next four problems use:  
 $h = -16t^2 + vt + c$

25. If a cannonball is fired at a velocity of 160 miles per second from a height of 2 feet, how many seconds until the ball reaches maximum height and what will that height be?

$$\begin{aligned} h &= -16t^2 + 160t + 2 \\ t &= \frac{-160}{2(-16)} = \frac{-160}{-32} = 5 \\ h &= -16(5)^2 + 160(5) + 2 \\ &= -400 + 800 + 2 \\ &= 400 + 2 \\ &= 402 \end{aligned}$$

In 5 seconds the cannonball will be at 402 feet.

22. Gizmos cost \$2 to ship and widgets cost \$3 to ship. If a company is shipping 50 gizmos and widgets for \$122, how many are gizmos and how many are widgets?

Let  $g$  = Gizmos  
Let  $w$  = Widgets

$$\begin{aligned} 2(g+w=50) &\rightarrow -2g-2w=-100 \\ 2g+3w=122 &\rightarrow 2g+3w=122 \\ \hline w &= 22 \end{aligned}$$

22 widgets  
28 gizmos  $\leftarrow w=22$

24. The tooth fairy left little Jenny 12 coins, all nickels and dimes totaling .95¢. How many coins were nickels and how many were dimes?

$$\begin{aligned} 10(n+d=12) &\rightarrow -10n-10d=-120 \\ 5n+10d=95 &\rightarrow 5n+10d=95 \\ \hline -5n &= -21 \end{aligned}$$

5 nickels  
7 dimes  $\leftarrow n=5$

26. If a rocket is launched at a velocity of 96 miles per second from a 10 foot platform, how many seconds until the rocket reaches maximum height and what will that height be?

$$\begin{aligned} h &= -16t^2 + 96t + 10 \\ t &= \frac{-96}{2(-16)} = \frac{-96}{-32} = 3 \\ h &= -16(3)^2 + 96(3) + 10 \\ &= -144 + 288 + 10 \\ &= 144 + 10 \\ &= 154 \end{aligned}$$

In 3 seconds the rocket will be at 154 ft.

# Algebra I – End of Course Review

14. If an egg is thrown up and off the roof of a 100 foot building with an initial upward velocity of 10 feet per second, how long until it hits the ground?

$$h = -16t^2 + 10t + 100$$

$$\begin{aligned} a &= -16 & b &= 10 & c &= 100 \\ x &= \frac{-10 \pm \sqrt{100 - 4(-16)(100)}}{2(-16)} \\ x &= \frac{-10 \pm \sqrt{100 + 6400}}{-32} \end{aligned}$$

\*only use positive answer.

$$x = \frac{-10 \pm \sqrt{6500}}{-32}$$

$$x = \frac{-10 \pm 80.6}{-32}$$

$$x = \frac{-90.6}{-32} \approx 2.8 \text{ seconds}$$

15. A clerk mixed \$3 a pound almonds with \$5 a pound cashews to make 10 pounds of a mixture worth \$4.50 a pound. How many pounds of each nut did he use?

Let  $x$  = pounds of almonds

$$3(x) + 5(10 - x) = 4.50(10)$$

$$3x + 50 - 5x = 45$$

$$-2x + 50 = 45$$

$$\begin{array}{r} -2x + 50 = 45 \\ -50 \quad -50 \\ \hline -2x = -5 \\ \hline x = 2.5 \end{array}$$

$$x = 2.5$$

2.5 lbs of almonds  
7.5 lbs of cashews

16. If Jasmine can wash the car in 30 minutes and Amanda can wash the car in 20 minutes. How long will it take them working together?

$$\frac{30 \times 20}{30 + 20} = \frac{600}{50} = 12$$

12 minutes

27. If a model rocket is launched from a 20 foot high platform at an initial upward velocity of 20 feet per second, how long until it crashes back to earth?

$$h = -16t^2 + 20t + 20$$

$$\begin{aligned} a &= -16 & b &= 20 & c &= 20 \\ x &= \frac{-20 \pm \sqrt{400 - 4(-16)(20)}}{2(-16)} \\ x &= \frac{-20 \pm \sqrt{400 + 1280}}{-32} \end{aligned}$$

$$x = \frac{-20 \pm \sqrt{1680}}{-32}$$

$$x = \frac{-20 \pm 41}{-32}$$

$$x = \frac{-61}{-32} \approx 1.9 \text{ seconds}$$

28. A scientist mixed some 10% acid solution with some 40% acid solution to make 600ml of 20% acid solution. How much of each did she use?

Let  $x$  = 10% acid solution

$$.10(x) + .40(600 - x) = .20(600)$$

$$.10x + 240 - .40x = 120$$

$$-.30x + 240 = 120$$

$$\begin{array}{r} -.30x + 240 = 120 \\ -240 \quad -240 \\ \hline -.30x = -120 \\ \hline x = 400 \end{array}$$

$$x = 400$$

400 ml of 10% acid  
200 ml of 40% acid

31. If Michael can load a truck in 10 hours and Daniel can load the truck in 8 hours. How long will it take them working together?

$$\frac{10 \times 8}{10 + 8} = \frac{80}{18} \approx 4.4$$

4.4 minutes

28. If a cannon ball is fired from a 40 foot cliff at an initial upward velocity of 30 feet per second, how long until it falls into the ocean?

$$h = -16t^2 + 30t + 40$$

$$\begin{aligned} a &= -16 & b &= 30 & c &= 40 \\ x &= \frac{-30 \pm \sqrt{900 - 4(-16)(40)}}{2(-16)} \\ x &= \frac{-30 \pm \sqrt{900 + 2560}}{-32} \end{aligned}$$

$$x = \frac{-30 \pm \sqrt{3460}}{-32}$$

$$x = \frac{-30 \pm 58.8}{-32}$$

$$x = \frac{-88.8}{-32} \approx 2.8 \text{ seconds}$$

30. \*Challenge: If 4 gallons of 10% salt solution is added to 6 gallons of 20% salt solution what percent salt will the mixture be?

Let  $x$  = % salt in mixture

$$.10(4) + .20(6) = x(10)$$

$$.40 + 1.20 = x(10)$$

$$\frac{1.60}{10} = \frac{10x}{10}$$

$$.16 = x$$

The mixture will be 16% salt.

24. If Jesse can paint a house in seven hours and Billy can paint the house in nine hours. How long will it take them working together?

$$\frac{7 \times 9}{7 + 9} = \frac{63}{16} \approx 3.9$$

3.9 minutes



# Algebra I – End of Course Review

17. Plane A leaves the airport traveling at 540 mph. Plane B follows 2 hours later at 630 mph. How long will Plane A have been flying when Plane B catches up?

Diagram: Plane A 540(x) →, Plane B 630(x-2) →

$$\begin{array}{r} 540x = 630(x-2) \\ 540x = 630x - 1260 \\ -630x \quad -420x \\ \hline -90x = -1260 \\ x = 14 \end{array}$$

14 hours

18. A plane flies from LA to Denver at an average speed of 240 mph. It returns to LA at an average speed of 360 mph. If the entire trip took 5 hours how long did it take to fly to Denver?

Diagram: LA → 240(x) → Den, ← 360(5-x) ←

$$\begin{array}{r} 240x = 360(5-x) \\ 240x = 1800 - 360x \\ +360x \quad +360x \\ \hline 600x = 1800 \\ x = 3 \end{array}$$

3 hours to Denver

19. Plane A leaves the airport going West at 280 mph. At the same time, Plane B leaves the airport going East at 360 mph. How long until the planes are 1600 miles apart?

Diagram: ← 280(x) ←, → 360(x) →, 1600 miles

$$\begin{array}{r} 280x + 360x = 1600 \\ 640x = 1600 \\ x = 2.5 \end{array}$$

2.5 hours

33. Train A leaves the station traveling at 120 mph. Train B follows 3 hours later at 150 mph. How long will Train A have traveled when Train B catches up?

Diagram: Train A 120(x) →, Train B 150(x-3) →

$$\begin{array}{r} 120x = 150(x-3) \\ 120x = 150x - 450 \\ -150x \quad -150x \\ \hline -30x = -450 \\ x = 15 \end{array}$$

15 hours

35. Joey takes a train from San Diego to Sacramento and travels at 120 mph. She takes a car home and travels at an average of 80 miles per hour. If the entire trip took 10 hours, how long did it take him to drive home?

Diagram: SD → 120(x) → S, ← 80(10-x) ←

$$\begin{array}{r} 120x = 80(10-x) \\ 120x = 800 - 80x \\ +80x \quad +80x \\ \hline 200x = 800 \\ x = 4 \end{array}$$

4 hours to drive home

37. Train A leaves the station going North at 120 mph. An hour later, Train B leaves the station going South at 100 miles an hour. How long until the trains are 1000 miles apart?

Diagram: ← 120(x) ←, → 100(x-1) →, 1100 miles

$$\begin{array}{r} 120x + 100(x-1) = 1000 \\ 120x + 100x - 100 = 1000 \\ 220x - 100 = 1000 \\ 220x = 1100 \\ x = 5 \end{array}$$

5 hours

34. A sailboat leaves port traveling at 20 mph. A jet boat follows 4 hours later traveling at 100 mph. How long does it take the jet boat to catch up?

Diagram: Sailboat 20(x) →, Jetboat 100(x-4) →, \*Careful!

$$\begin{array}{r} 20x = 100(x-4) \\ 20x = 100x - 400 \\ -100x \quad -100x \\ \hline -80x = -400 \\ x = 5 \end{array}$$

1 hour

36. Lisa leaves her campsite in her motorboat and travels up river at only 30 mph. Then she returns downstream at 50 mph. If the entire trip took 8 hours, how long did it take her to go up river?

Diagram: ↑ 30(x) ↑, ↓ 50(8-x) ↓

$$\begin{array}{r} 30x = 50(8-x) \\ 30x = 400 - 50x \\ +50x \quad +50x \\ \hline 80x = 400 \\ x = 5 \end{array}$$

5 hours

38. A motor boat leaves the city of Luxor going up the Nile at 35 miles an hour. Three hours later, a jet boat leaves Luxor going down river at 80 miles an hour. How long until the boats are 910 miles apart?

Diagram: ← 35(x) ←, → 80(x-3) →, Motorboat Luxor Jetboat, 910

$$\begin{array}{r} 35x + 80(x-3) = 910 \\ 35x + 80x - 240 = 910 \\ 115x - 240 = 910 \\ 115x = 1150 \\ x = 10 \end{array}$$

10 hours